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Black cohosh (*Actaea racemosa*) at Bryant Creek State Park; article on p. 27. Photo by Paul Nelson.

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Missouri Native Plant Society

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Journal of the Missouri Native Plant Society

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ACKNOWLEDGMENTS FOR VOLUME 40

Welcome to the 40th volume of Missouriensis — the fact that a fully volunteer organization has persevered and prospered for so long is a direct reflection of the passion, commitment, and contributions of many people over the decades.

The first issue of Missouriensis was published in summer 1979, shortly after the Society formed. For its first five years, Missouriensis was a newsletter-like publication with four numbers per annual volume. The time and editorial submissions necessary to sustain four numbers per year must have been draining, and after five years, Missouriensis reverted to two numbers per annual volume from volume 6 (1985) through volume 16 (1995). Since then, there has been a single volume most years, with a gap from 2010-2011. In 2016 (volume 34), the journal became an open-access, all electronic publication, allowing greater flexibility and images while also reducing environmental impacts associated with production and distribution of a paper journal.

As Missouriensis became a more scientifically focused journal, in 1986 the Society began publishing a separate newsletter, the Petal Pusher. This newsletter contains updates and information about the Society and its chapters, as well as a wealth of information about Missouri plants. Thanks to a series of incredibly dedicated editors and volunteers, the Petal Pusher continues to publish six issues per year (except for 1992, when four issues were published).

Together, the Petal Pusher and Missouriensis reflect the vibrant character of the Missouri Native Plant Society and provide a deep connection with Missouri's plants. The tradition continues with this 40th volume of the journal, which includes three articles about various aspects of our flora and vegetation.

This issue also includes a longer, detailed analysis of the flora and vegetation of Bryant Creek State Park, which officially opened in 2022 and should be the site of a future Society field trip. After reading Paul Nelson's report to DNR on the park's flora and vegetation, I asked if he would consider publishing a modified version here. The detailed accounts of the site's natural communities and flora paint an enticing picture that will make readers eager to visit and sample the botanical wonders for themselves. The article also provides an enlightening window into the site's vegetation and abiotic character and relationships among a suite of Ozark natural communities, enumerated by the person who literally wrote the book on the subject. I view this analysis much like the best accounts from early explorer-botanists in North America and hope it will serve as an enduring benchmark of the site's natural character for future reference.

Missouriensis would not be possible without submissions from authors and many people who contribute time and skills in reviewing manuscripts, assisting with editing, and providing expertise. For this issue, thanks go to Mike Arduser, Michelle Bowe, Malissa Briggler, Steve Buback, Craig Freeman, Caleb Morse, Bruce Schuette, Scott Schuette, Dana Thomas, and Justin Thomas. Special thanks to Cindy Pessoni, who, as she has since volume 34, applies her formatting and editorial superpowers for the benefit of the Society. In many respects she serves as a shadow co-editor, but stubbornly refuses to be recognized as such. I am eternally grateful for her skills, patience, and insight.

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A new record for *Carex fissa* var. *fissa* in Missouri and notes on its ecology and identification

PAUL M. MCKENZIE[1] AND PAUL W. NELSON[2]

ABSTRACT. — *Carex fissa* var. *fissa* is reported from a new site in Taney County, Missouri; this is the seventh record for the state. Identifying characteristics and suggested origin of these populations are discussed.

Carex fissa Mackenzie var. *fissa* [section *Multiflorae* (Kunth) Mack.] is endemic to Arkansas, Illinois, Kansas, Mississippi, Missouri, Oklahoma, and Texas and is listed as a critically imperiled (S1) species of conservation concern in Arkansas, Kansas, Mississippi, and Missouri (NatureServe 2022). A second variety, var. *aristata* F.J. Hermann, extends from North Carolina south to Florida and west to Mississippi (Bryson et al. 1996, Kartesz 1999, Standley 2002).

Surprisingly, the species is also introduced in Alexandria County, Virginia (Simmons et al. 2008; duplicate: MICH 1370160), Talbot County, Maryland (Knapp et al. 2011; duplicates MICH 1370147 & 1399126), and even Japan (Katsuyama 2003); these introductions are likely via imported hay for stream bank stabilization. Images of the MICH specimens are available online through https://lsa.umich.edu/herbarium/databases.html.

Rangewide, NatureServe (2022) lists the taxon at < 60 occurrences/counties and projects a population estimate between 2,500 and 1 million individuals. Habitats for *Carex fissa* var. *fissa* includes prairie swales, open roadside ditches, and railroad rights-of-way, and mesic to hydric lakesides (Jones et al. 1990, Yatskievych 1999, Standley 2002).

In Missouri, *C. fissa* var. *fissa* is scattered across the Ozark Highlands, Osage Plains, and Mississippi Lowlands Alluvial Plains Sections (Yatskievych 1999, Nigh & Schroeder 2002), and has been documented in Barton, Jasper, Laclede, Ozark, Phelps, and Ripley counties (Yatskievych 1999, Tropicos 2022). Habitats for the Missouri specimens of *C. fissa* var. *fissa* listed in Tropicos (2022) include ditches, open disturbed roadsides and rights-of-ways, prairie swales, and wet marshy meadows with spring fed pools. The species has a wetness rating of facultative in Ladd & Thomas (2015). Such plants often occur in hydric soils, often in geomorphic settings where water saturates the soils or floods the soil surface at least seasonally.

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While conducting a plant inventory for the Ozark Underground Laboratory (OUL) in Taney County, Missouri on 8 June 2022, we discovered a large population of *Carex fissa* var. *fissa* lining the edges of two adjacent ponds on the property (**Figure 1**). We estimated several hundred flowering culms occurred at each pond. Associates with *C. fissa* var. *fissa* included *C. annectens* var. *xanthocarpa*, *Carex granularis*, *Carex vulpinoidea*, *Festuca arundinacea*, *Rumex crispus*, *Schoenoplectus mucronatus*, and *Eleocharis quadrangulata* (nomenclature and authorities follow Yatskievych 1999, 2013).

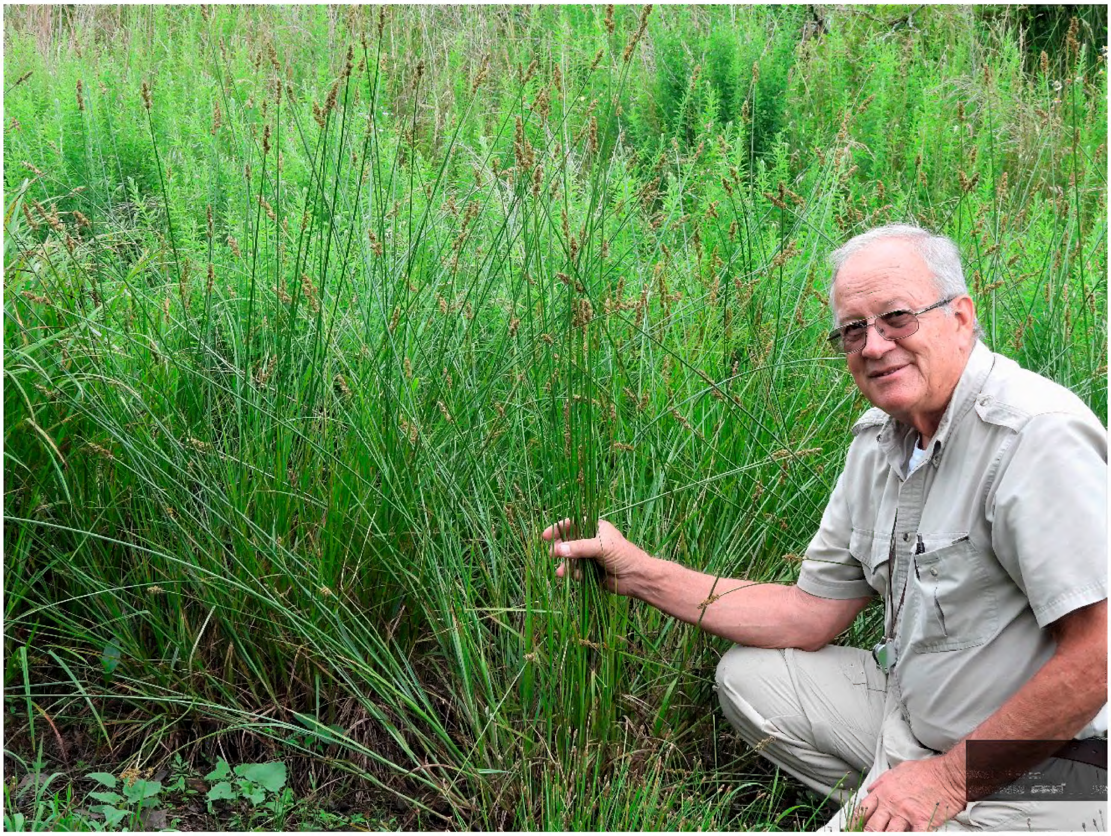

Figure 1. Paul Nelson with 1-meter-tall culms of *Carex fissa* var. *fissa*. Photo by Paul McKenzie.

As noted by Yatskievych (1999), the habit of *Carex fissa* var. *fissa* superficially resembles a robust member of section *Phaestoglochin*, especially those species in the section lacking spongy or corky tissue at the base of the perigynia, but differs in its compound inflorescences and its firm, bluntly triangular stems. Within section *Multiflorae*, *Carex fissa* var. *fissa* differs from *Carex vulpinoidea* and *Carex annectens* var. *xanthocarpa* by its thicker, more robust culms; and its thicker, more compact, and wider spikes (Yatskievych 1999). *Carex fissa* var. *fissa* also differs from *C. vulpinoidea* by its leaves being shorter than the flowering culms, and its less pointed and shorter spikes (Standley 2002, Mohlenbrock 2011). Compared to *C. annectens* var. *xanthocarpa, Carex fissa* var. *fissa* has a noticeably more compact inflorescence with larger perigynia that are yellow green to pale brown vs. golden brown to yellow brown (Standley 2002) [see **Figures 2** & **3**].

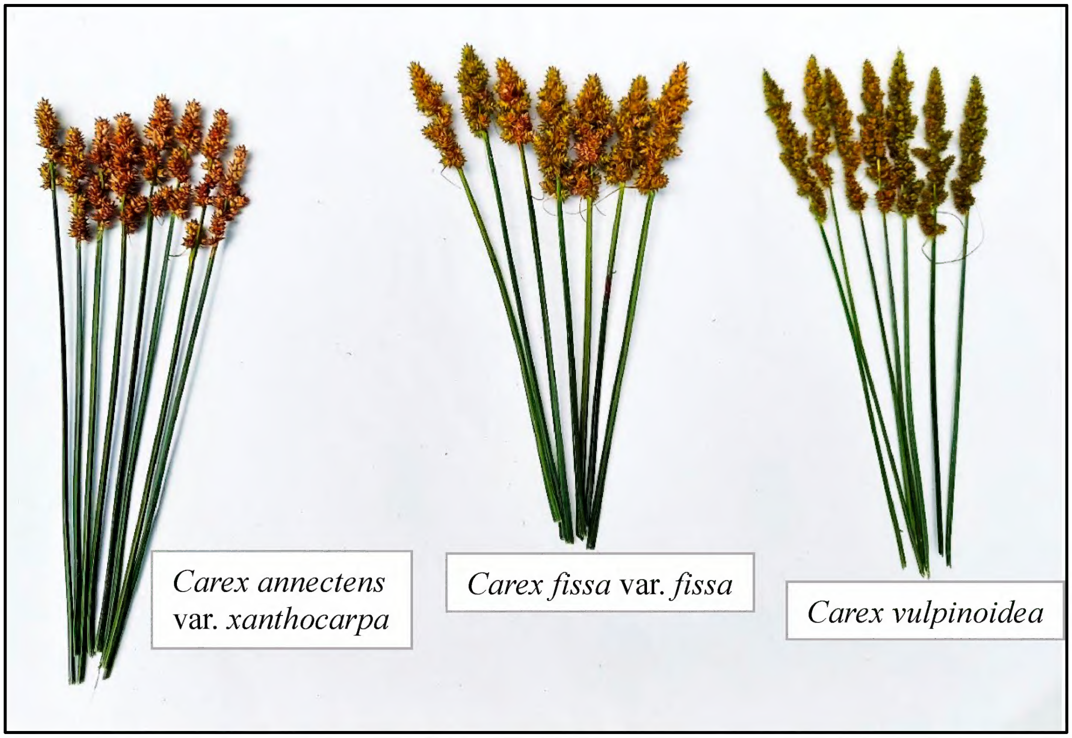
Carex annectens var. *xanthocarpa*
Carex fissa var. *fissa*
Carex vulpinoidea

Figure 2. Comparison of inflorescences of *Carex annectens* var. *xanthocarpa*, *C. fissa* var. *fissa,* and *Carex vulpinoidea.* Photo by Paul Nelson.

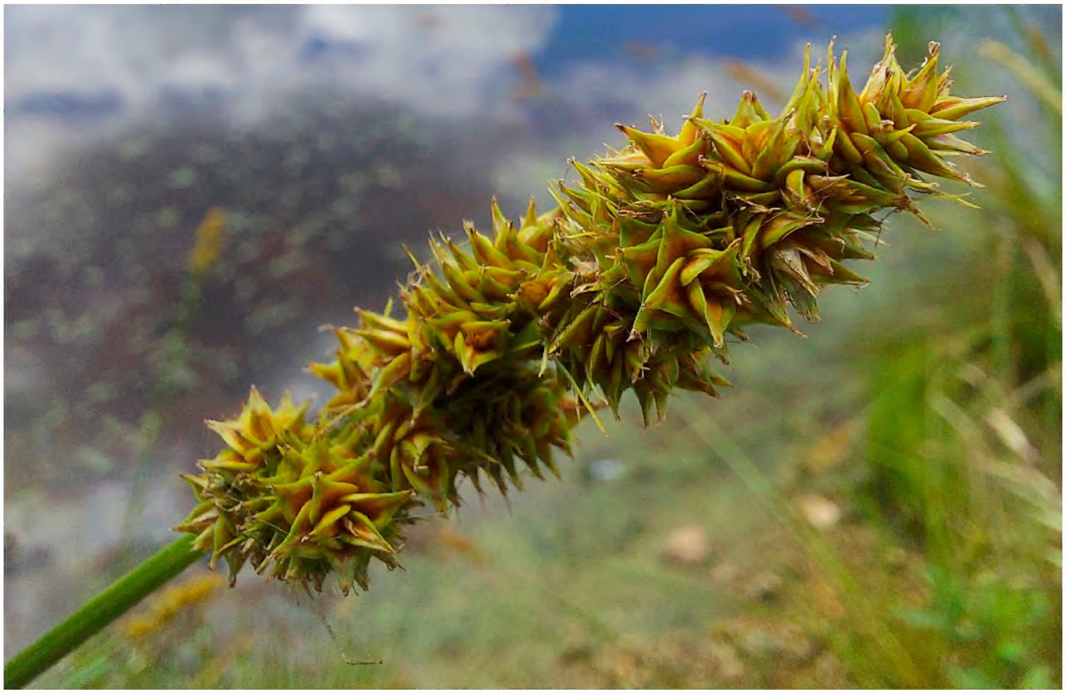

Figure 3. Compact inflorescence of *Carex fissa* var. *fissa* with yellow-green perigynia. Photo by Paul Nelson.

The origin of *Carex fissa* var. *fissa* at the OUL sites is unknown. It is possible that perigynia were brought in on the feet of migrating waterfowl or were part of nearby prairie swales that existed prior to livestock grazing and pond construction. Ozark Underground Laboratory's only record of *Carex aureolensis* Steudel is from a swale within six hundred meters of one of the ponds inhabited by *Carex fissa* var. *fissa*, and it is possible that the current populations of this species at OUL originated from such habitats.

It is likely that botanical inventories of ponds, prairie swales, and roadside ditches throughout southern Missouri will yield additional records of this taxon.

> *Voucher specimen:* **U.S.A. MISSOURI:** TANEY CO.: Ozark Underground Laboratory, edge of pond number 32, ca. 1,170 meters WNW of intersection of Rt. 125 and Rozell Rd, 36.575671 -92.855621, 9 Jun 2022, *Nelson 3030* (MO).

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We thank Tom and Cathy Aley for providing logistic support for this project. A.A. Reznicek provided clarification on the status of *Carex fissa* var. *fissa* in the eastern United States.

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New Missouri bryophyte records and an expanded distribution for *Trichostomum crispulum* in eastern North America

JOHN J. ATWOOD[1] AND JOHN C. BRINDA[2]

ABSTRACT. — Ten bryophyte taxa — four liverworts and six mosses — are newly reported for Missouri, with notes regarding their morphology, distribution, ecology, and voucher specimen citations. The eastern North America range of *Trichostomum crispulum* is expanded to include Arkansas, Kentucky, Missouri, Nebraska, and Ohio. *Tortella tortuosa* is confirmed for Missouri based on recent Shannon County collections. Previous reports of this species from Taney County were based on mis-determinations of *T. humilis*.

INTRODUCTION

The last several years of fieldwork conducted by the authors, along with herbarium studies of specimens in the Crosby Bryophyte Herbarium at the Missouri Botanical Garden (MO), have discovered four liverworts and six mosses new to the Missouri bryoflora. The new liverworts — *Apopellia megaspora*, *Cephaloziella hyalina*, *Odontoschisma denudatum* subsp. *denudatum* and *Riccia campbelliana* subsp. *campbelliana* — increase the number of Missouri liverworts to 120 taxa (Atwood 2014, 2016; Atwood & Brinda 2015, 2019). The new mosses — *Entosthodon serratus*, *Philonotis hastata*, *Polytrichum strictum*, *Saelania glaucescens*, *Trichostomum crispulum*, and *Zygodon rupestris* — raise the number of documented Missouri mosses to 332 taxa (Atwood & Holmberg 2018; Darigo 2015; Holmberg & Atwood 2014). In addition to several new Missouri sites for *T. crispulum*, the eastern North America range of this species is expanded to include localities in Arkansas, Kentucky, Nebraska, and Ohio. Lastly, *Tortella tortuosa* is confirmed for Missouri based on recently collected specimens from Shannon County. Previous reports of this taxon from Taney County were based on mis-determined specimens of *T. humilis*. All cited voucher specimens are deposited in MO.

FLORISTIC ENUMERATION

Apopellia megaspora (R.M. Schust.) Nebel & D. Quandt (Figure 1)

This calcareous species was described by Schuster (1981, as *Pellia megaspora* R.M. Schust.) for its delicate, deep-green plants, very large spores [64–77(80) × 100–115(120) µm] and lack of autumnal innovations and anthocyans. In eastern North America, the species has been reported from Labrador, south throughout New England and west to Minnesota (Schütz et al. 2016;

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Stotler & Crandall-Stotler 2017). However, *A. megaspora* is likely to have an even greater distribution if specimens determined as *P. endiviifolia* (Dicks.) Dumort. are considered. *Pellia endiviifolia* [≡*Apopellia endiviifolia* (Dicks.) Nebel & D. Quandt] is now treated as a European, north African, and Asiatic species whose distribution excludes North America (Schütz et al. 2016; Stotler & Crandall-Stotler 2017). Whereas *Apopellia* species have multicellular slime papillae at the ventral apex of the thallus and a cylindrical pseudoperianth, *Pellia* species have 1(–2)-celled clavate slime papillae at the ventral apex of the thallus and a flap-like pseudoperianth (Schuster 1992; Schütz et al. 2016). The multicellular slime papillae in the Missouri specimens leave no doubt as to their affinity with *Apopellia* rather than *Pellia.*

> *Voucher Specimen:* **U.S.A. MISSOURI:** FRANKLIN CO.: Shaw Nature Reserve, S of Maritz Trail House along slopes and small draw W of Wildflower Trail, on sandstone in hardwood forest, 38.463527, -90.820653, 3 Nov. 2021, *Brinda et al. 14638* (MO 7035924).

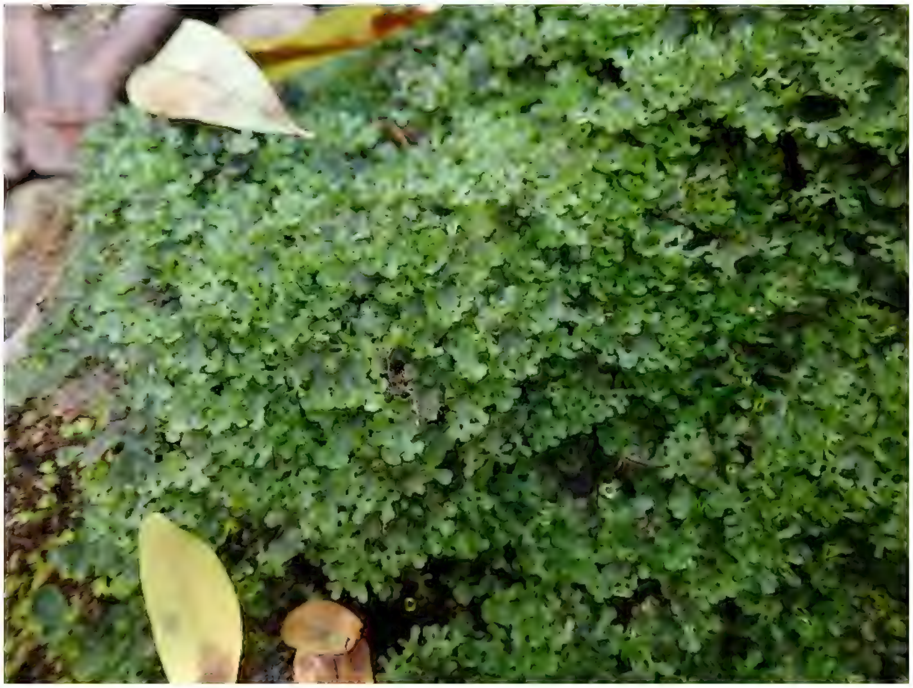

Figure 1. *Apopellia megaspora* from *Brinda et al. 14638,* Franklin County, Missouri. Photo by John C. Brinda.

Cephaloziella hyalina **Douin**

Cephaloziella hyalina appears to be a common but overlooked element in the bryoflora of the southeastern United States (Schuster 1980; Wagner 2017). This light-green, autoicous species grows mostly on soil and has small creeping shoots; wide-spreading, obliquely inserted leaves; and vestigial, 1–2-celled underleaves that usually terminate in slime papillae. The leaves are usually 4–7 cells wide and bifid for more than half their length into two narrow lobes.

> *Voucher Specimens:* **U.S.A. MISSOURI:** CEDAR CO.: ca. 1 mile S of Arnica on highway AA, gullies and rocky soil of oak-hickory forest with numerous sandstone exposures, soil on bank of creek, sec. 6 T34N R25W, 1 July 1963, *Redfearn 12878* (MO 3956753). ST. CLAIR CO.: ca. 1.5 miles SE of Johnson City, hickory forest with extensive sandstone bluffs, on sandy soil, sec. 5 T38N R27W, 2 July 1963, *Redfearn 13523* (MO 2847216). STE. GENEVIEVE CO.: Hawn State Park, Orchid Valley, near small seasonal waterfall, on soil of muddy stream bank in wooded bottomland, 37.7941666, -90.2655556, 5 May 2013, *Holmberg 4597* (MO 6495001).

Entosthodon serratus **(Brid.) Fife**

Endemic to the southeastern United States, *E. serratus* is distributed from North Carolina to Oklahoma, south to Florida and Texas (Miller & Miller 2007 as *Funaria serrata* Brid.). Its small plants occur on soil in disturbed habitats and have oblong-lanceolate leaves, broadly acute apices, sub-percurrent to percurrent costae as well as distinctly serrate distal margins. The presence of inclined and curved, 1.5–2.0 mm long, smooth capsules and the lack a revolvable annulus help to distinguish it from the more commonly encountered Funariaceae in Missouri, i.e., *Funaria hygrometrica* Hedw. and *F. flavicans* Michx. Furthermore, those species have more densely gregarious plants while plants of *E. serratus* tend to be more scattered.

> *Voucher Specimen:* **U.S.A. MISSOURI:** JEFFERSON CO.: Victoria Glades Conservation Area, along trail in NW corner of area, hardwood forest, on soil along trail, 38.2039300, -90.5442600, 27 May 2013, *Brinda et al. 4568* (MO 6491870).

Odontoschisma denudatum **(Mart.) Dumort. subsp. *denudatum***

This species is widespread in eastern North America, ranging from New Brunswick to Minnesota, south to Florida (Stotler & Crandall-Stotler 2017). Reports of it from northwestern Arkansas (Timme & Redfearn 1997) are the nearest documented localities to the newly reported Missouri stations. *Odontoschisma denudatum* subsp. *denudatum* is characterized by its creeping stems with succubous, broadly ovate lateral leaves that are reduced in size towards both ends of the stem. The stems frequently terminate in a cluster of yellow-green, ellipsoidal, 2-celled gemmae. The median and marginal leaf cells are 18–24 µm long, strongly collenchymatous and have bulging trigones. In Missouri it differs from the more common and widespread *O. sphagni* (Dicks.) Dumort. [= *O. prostratum* (Sw.) Trevis. fide Gradstein & Ilkiu-Borges 2015] by the presence of gemmiferous shoots, strongly collenchymatous leaf cells with bulging trigones and the lack of differentiated marginal cells. The species is also corticolous, whereas *O. sphagni* is typically found on damp rock faces. Although *O. denudatum* subsp. *denudatum* has been listed as a Missouri species of conservation concern for several years, no reference to vouchered specimens has been previously published.

> *Voucher Specimens:* **U.S.A. MISSOURI:** STE. GENEVIEVE CO.: Hickory Canyon Natural Area, ca. 3 km N of Sprott, along drainage below tall LaMotte sandstone bluffs leading to box canyons, on decorticate log with *Nowellia*

curvifolia, 37.8833, -90.3000, 29 August 2011, *Atwood 1906* (MO b6238313). SHANNON CO.: Rocky Creek Conservation Area, Island Branch Natural Area, boulder field below Island Branch Cave, sparse on sides of well-rotted log, 37.0992700, -91.4727800, 6 Nov. 2021, *Atwood et al. 3859A* (MO 7034523).

Philonotis hastata **(Duby) Wijk & Margad.**

This widespread tropical to subtropical species occurs in seepage on wet soil over calcareous rock. It has a pale-green color, delicate habit and brood branches frequently produced in the upper leaf axils. The oblong-lanceolate leaves have acute or rounded apices, sub-percurrent costae, bluntly serrulate margins and a lax leaf cell areolation. These character states are superficially similar to those of *P. gracillima* Ångstr., a species of similar habitats and distributed in the southeastern United States, the Caribbean and Central/South America. As noted by Allen (2002) the morphological similarity between these two species, as well as *P. glaucescens* (Hornsch.) Broth., has resulted in taxonomic confusion and a poorly defined distribution of *P. hastata* in North America. *Philonotis gracillima* has papillose upper leaf cells that are approximately 10 µm wide or less (Zales 1973 as *P. glaucescens*). By comparison, the upper leaf cells of *P. hastata* are smooth to weakly papillose and 10–15 µm wide (Allen 2002). The Missouri specimens compare more closely to *P. hastata.*

Voucher Specimens: **U.S.A. MISSOURI:** SHANNON CO.: Rocky Creek Conservation Area, Island Branch Natural Area, along Island Branch above spring, streamside, on soil over rock in hardwood forest, 37.096192, -91.472688, 304.32m, 6 Nov. 2021, *Brinda et al. 14680* (MO7035938). TEXAS CO.: Mark Twain National Forest, Paddy Creek Wilderness, along Little Paddy Creek, downstream of junction with Big Piney Trail, on wet soil over rock in riparian hardwood forest, 37.530948, -92.091747, 344.5m, 9 Nov. 2013, *Brinda 4869* (MO 7035939).

Polytrichum strictum **Brid.**

Polytrichum strictum is widespread in North America and morphologically similar to *P. juniperinum* Hedw. in its leaf apices that end in reddish awns and its entire, broadly infolded leaf margins. *Polytrichum strictum* differs in having a dense matting of white rhizoids at the base of the stem, more stiffly erect leaves when dry and usually (see Allen 2014: 570) a close ecological association with *Sphagnum* L. The Missouri population was growing in a large hummock of *S. compactum* DC.

Voucher Specimen: **U.S.A. MISSOURI:** STE. GENEVIEVE CO.: Hawn State Park, Orchid Valley Natural Area, ca. 0.5 mile E of highway AA on Hawn Park Road, hardwood forest on sloping hillsides of wooded ravine, on wet sandy soil below ledge with *Sphagnum*, 37.7906000, -90.2647000, 15 Nov. 2013, *Atwood 2747* (MO 6493813).

Riccia campbelliana **M. Howe subsp.** ***campbelliana***

Originally described from California, this species has been reported from scattered states in eastern and interior North America, including Arkansas, Georgia, Kansas, Louisiana, Oklahoma, and Texas (Schuster 1992). In Kansas, where the species is common and known from 17 counties, McGregor (1955) notes *R. campbelliana* occurs on shallow soil over sandstone in prairies and open oak woods. This habitat is identical to that of the Missouri specimens cited here. *Riccia campbelliana* has gregarious, grey-green thalli with orange-brown or salmon colored lateral margins and an acute median sulcus near the apex of the thallus segment. The ventral scales are hyaline, imbricate with the thallus margin, and about the same height. It has brownish spores 82–100 µm in diameter that are angular with a narrow wing margin and a vermicular ornamentation on both proximal and distal faces; the sinuous lamellae are elevated at the nodes as papillae that occasionally form distinct areola.

> *Voucher Specimens:* **U.S.A. MISSOURI:** BARTON CO.: Prairie State Park, Regal Prairie Natural Area, Sandstone Trail between NW130th Ln. and East Drywood Creek, hills and slopes occasionally capped with rock outcrops, on soil over exposed sandstone with *Riccia hirta*, 37.5197000, -94.5460000, 21 Apr. 2014, *Atwood & Brinda 2753A* (MO 7036421). DADE CO.: Corry Flatrocks Preserve, S of Corry on County Road 761, ca. 0.80 miles N of Corry Branch crossing at intersection with County Road 290, on margins of outcropping, exposed, sandstone bedrock in prairie and pasture with *Riccia beyrichiana* and *R. tenella*, 37.4857100, -93.7279100, 9 Apr. 2015, *Atwood & Holmberg 3079* (MO 6764009).

Saelania glaucescens **(Hedw.) Broth.**

This small moss has a widespread but scattered distribution in North America, ranging from Newfoundland to Alaska and south to New Jersey and Arizona. Iowa is the nearest documented station to Missouri (Seppelt 2007). The lanceolate and gradually acuminate leaves, percurrent costae, reflexed and irregularly serrate margins and subquadrate to short-rectangular leaf cells are superficially similar to the morphology of *Ceratodon purpureus* (Hedw.) Brid., but its blueish-glaucous color distinguishes it from that species as well as all other mosses in the Midwestern bryoflora.

> *Voucher Specimen:* **U.S.A. MISSOURI:** TEXAS CO.: Mark Twain National Forest, Paddy Creek Wilderness, along Little Paddy Creek, downstream of junction with Big Piney Trail, on cherty limestone in riparian hardwoods, 37.530948, -92.091747, 9 Nov. 2013, *Brinda 4865* (MO 7035940).

Tortella tortuosa **(Schrad.** ***ex*** **Hedw.) Limpr. (Figure 2)**

This species is a widespread calciphile in North America, distributed from Newfoundland south to Virginia, west to Alaska, California, and Texas (Eckel 2007). Gier (1955) reported *T. tortuosa* from Missouri based on two Taney County specimens deposited at Iowa State University (ISC). Although Redfearn (1972) re-examined this material and found them to be misdeterminations of *T. humilis* (Hedw.) Jenn., his annotations were overlooked by Darigo (2015) who cited *T. tortuosa* from Taney County. The specimens constituting Gier's (1955) report of *T. tortuosa* (*Conard 40-1105* and 29 Aug. 1931, *Rissens s.n.*) have duplicates in MO (MO 4449075 and 4449076) that have Paul Redfearn's annotations of *T. humilis* from 1966. *Tortella tortuosa* is dioicous, but both specimens are autoicous, as is *T. humilis*, and both have sporophytes. Additionally, the stems have a central strand in cross section; a diagnostic feature of *T. humilis*. In contrast, a central strand is lacking in *T. tortuosa*. Finally, the leaves are contorted when dry, oblong-lanceolate and 2–3 mm long with broadly acute apices that terminate in a short mucro. In comparison the leaves of *T. tortuosa* are spirally twisted when dry, linear-lanceolate, 4–5 mm long and gradually acuminate with a long apiculus. *Tortella tortuosa* is confirmed for Missouri based on the Shannon County specimens cited here.

> *Voucher Specimens:* **U.S.A. MISSOURI:** SHANNON CO.: Rocky Creek Conservation Area, Island Branch Natural Area, boulder field below Island Branch Cave, on dry tops of dolomite boulders, 37.0992700, -91.4727800, 6 Nov. 2021, *Atwood et al. 3854* (MO 7034540) & *3868* (MO 7034536), *Brinda et al. 14659* (MO 7035941).

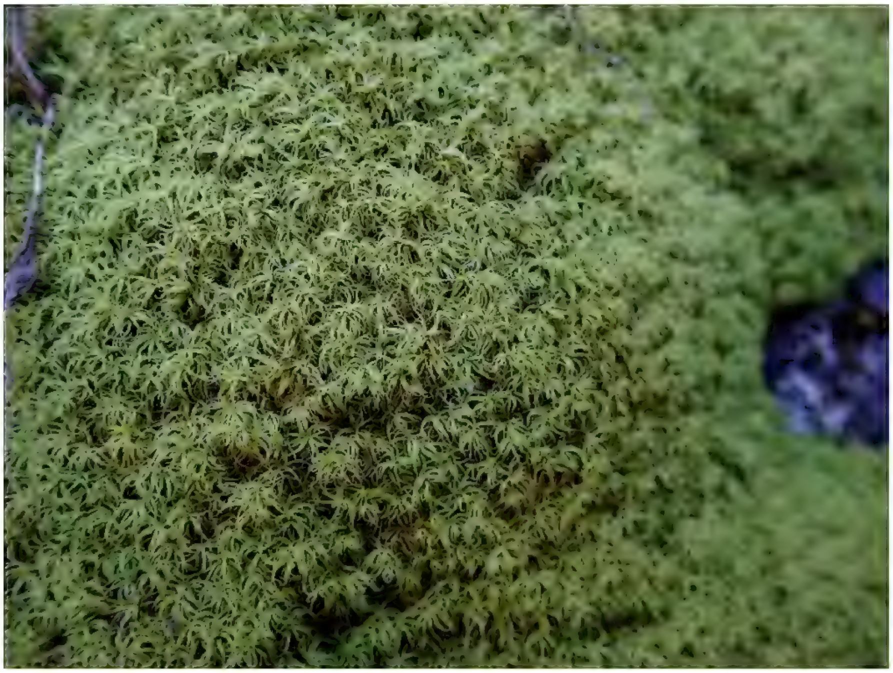

Figure 2. *Tortella tortuosa* from *Brinda et al. 14659*, Shannon County, Missouri. Photo by John C. Brinda.

Trichostomum crispulum Bruch (Figure 3)

This species has a widespread but scattered distribution in North America occurring on igneous and calcareous substrates from Greenland to Alaska, south to Florida, Texas, California, and Arizona (Zander 2007a). As noted by Zander (2007a,b), specimens of *T. crispulum* from the midwestern and southeastern states are morphologically similar to *Weissia jamaicensis* (Mitt.) Grout, a Neotropical species reported as far north as Missouri in eastern North America (Zander

2007b). Both species are dioicous and have lanceolate leaves with cucullate apices, erect to weakly inflexed distal margins and stout costae that in cross section have two stereid bands (Zander 2007a,b). Redfearn (2005) reported *W. jamaicensis* from eight Arkansas counties, while Darigo (2015) reported it from 17 Missouri counties. After collecting authentic *T. crispulum* specimens in Arkansas, Kentucky, Missouri and Ohio, a re-examination of the Interior Highland specimens of *W. jamaicensis* deposited in MO was undertaken to evaluate whether these specimens are also *T. crispulum*. Indeed, based on leaf cross-sections almost all of the specimens could be referred to *T. crispulum* or other superficially similar species, such as *W. controversa* Hedw. or *W. muhlenbergiana* (Sw.) W.D. Reese & B.A.E. Lemmon. As seen in leaf cross-sections *T. crispulum* has a semicircular to reniform shaped costa with the abaxial (lower) surface and stereid band larger or of equal in size to the adaxial (upper) surface and stereid band. In comparison, leaf cross-sections of *W. jamaicensis* have a prominent, obovate shaped costa with the adaxial (upper) surface strongly bulging and an enlarged stereid band versus the weakly bulging abaxial (lower) surface and moderately enlarged stereid band. The two species also differ slightly in their dry leaf stance and appearance: curled to crisped and glossy in *T. crispulum* versus wiry to spirally contorted and glaucous in *W. jamaicensis*. Consequently, the Interior Highlands distribution of *W. jamaicensis* is more restricted than previously thought, with authentic material not seen from Arkansas and only a single collection found in Missouri (Stone County, *Redfearn et al. 5439*, MO 2036632 & 4422875). In Missouri, *W. jamaicensis* deserves a state listing as a species of conservation concern, whereas *T. crispulum*, although newly reported, is known from numerous localities across 15 counties.

> *Voucher Specimens:* **U.S.A. ARKANSAS:** BENTON CO.: U.S. Army Corps of Engineers lands, on bluffs above Beaver Lake, ca. 1.8 km W of Pine Top, woodland, dolomite glade, rock crevice, 36.325942, -93.898115, 368.8m, 5 May 2014, *Brinda et al. 5986* (MO 7036410). NEWTON CO.: "Lost Valley" ca. 4 miles SW of Ponca. T16N R23W, 19 Mar. 1963, *Redfearn 11949* (MO 3957639). POPE CO.: Long's Pool NW of Scottsville, soil on cliff above river, 28 May 1953, *Anderson 11953* (MO 5351385). **KENTUCKY:** WOLFE CO.: Daniel Boone National Forest, Clifty Wilderness, along Swift Camp Creek between Chestnut Log Branch and Rose Drake Branch, *Tsuga*-hardwood forest, on sandstone rock, 37.773715, -83.563717, 19 July 2014, *Brinda 6331* (MO 7036413). **MISSOURI:** CAPE GIRARDEAU CO.: Trail of Tears State Park, along Sheppard Point Loop Trail, limestone rock crevice in hardwood forest, 37.445730, -89.453820, 23 Sept. 2012, *Brinda 4009* (MO 6491650). CARTER CO.: Big Springs, moist shaded limestone bluff, 21 Oct. 1968, *Sharp 6630A* (MO 3958651). CHRISTIAN CO.: Along S bank of James River and adjacent bluffs, secs. 5–6 T27N R22W, 11 July 1961, *Redfearn 8893* (MO 2041040, 3957160). DADE CO.: Open limestone glade, ca. 3 miles E of Neola, on exposed limestone, sec. 19 T32N R21W, 27 July 1960, *Redfearn 6804* (MO 3957161). DENT CO.: Montauk State Park, on N side of Hwy 119 bridge and E bank of Current River, scattered small patches on sandy deposits over granite block of unshaded, S-facing wall at boat ramp to riverbank, NE1/4 NE1/4 sec. 27 T32N R7W, 27 Nov. 1998, *Darigo & Darigo 3297* (MO 5124155,

5363729). HOWELL Co.: Mark Twain National Forest, Carman Springs Natural Area, along Spring Creek between Spring Hollow and Carman Spring, on limestone in hardwood forest, 36.917055, -92056503, 17 May 2014, *Brinda 6035* (MO 7036407). JEFFERSON CO.: Myron and Sonya Glassberg Family Conservation Area, N-facing cliffs along the Meramec Ricer, on sandstone in hardwood forest, 38.44563, -90.677977, 20 April 2014, *Brinda #'s 5878* (MO 7036409), *5879* (MO 7036411); Valley View Glades Conservation Area, on Valley View Trail, ca. 0.75 miles NE of parking lot, on unshaded, sandy soil above limestone on S-facing slope of glade above creek, NW1/4 sec. 30 T41N R4E, 15 May 1997, *Darigo 2846* (MO 4418782). MARIES CO.: Along Clifty Creek, ca. 4 miles E of Shantytown, on limestone beneath ledge, SW1/4 sec. 6 T38N R9W, 8 July 1967, *Redfearn 21630* (MO 3957147). MCDONALD CO.: Along a small spring-fed creek adjacent to highway E, ca. 2 miles S of Powell, on underside of limestone ledge, sec. 28 T32N R30W, 27 June 1962, *Redfearn 10852* (MO 3957159). Along Mill Creek near Mill Creek Baptist Church, NE-facing wooded slopes and limestone bluffs, on shallow soil in limestone crevice, T21N R32W, 2 Apr. 1960, *Redfearn & Houk 5389* (MO 3973662). OREGON CO.: Mark Twain National Forest, Irish Wilderness, along Whites Creek Trail, near small spring flowing into Whites Creek, on limestone in hardwood forest, 36.741497, -91.185946, 2 May 2015, *Brinda 7429* (MO 7036417). Mark Twain National Forest, Irish Wilderness, along Whites Creek, N-facing limestone bluff W of Fiddler Spring, on limestone in hardwood forest, 36.729460, -91.199398, 2 May 2015, *Brinda 7463* (MO 7036415). Greer Springs, ca. 6 miles N of Alton, on shaded vertical limestone, SW1/4 sec. 36 T25N R4W, 31 May 1960, *Redfearn 6000* (MO 3957146), 12 July 1963, *Redfearn 14001* (MO 3957162). PULASKI CO.: S-facing dolomite bluffs along spring branch of Pruett Springs, ca. 2 miles S of Big Piney, rocks along creek bed, sec. 32 T34N R10W, 16 Oct. 1960, *Redfearn 7694* (MO 3957145). SHANNON CO.: Rocky Creek Conservation Area, boulder field below Island Branch Cave, on dry tops of dolomite boulders, 37.0992700, -91.4727800, 6 Nov. 2021, *Atwood et al. 3842* (MO 7034507), *Brinda et al. 14658* (MO 7035055). Pulltight Spring, ca. 5 miles S of Rector, NW1/4 sec. 4 T30N R5W, 14 June 1961, *Redfearn 8490* (MO 3957156). ST. FRANCOIS CO.: St. Francois State Park, Coonville Creek Wild Area, limestone bluffs along the Swimming Deer Trail, hardwood-cedar forest, on limestone, 37.954895, -90.515015, 26 Apr. 2015, *Brinda #'s 7416* (MO 7036412), *7417* (MO 7036414). TEXAS CO.: N-facing slope and alluvial soil along small creek ca. 5 miles E of junction of highways U and HH, crevices of limestone rocks and sand soil, 16 Apr. 1960, *Redfearn 5503* (MO 3957153, 3957157). WEBSTER CO.: W-facing limestone and dolomitic bluffs and oak hickory forest with cherty soil along Terell Branch, ca. 3.5 miles S of Fordland, on shaded limestone along branch, sec. 20 T28N R18W, 29 June 1961, *Redfearn 8732* (MO 3973663). WRIGHT CO.: W-facing wooded bluffs along Gasconade River ca. 0.5 miles E of Hartville, on shaded limestone ledge, NW1/4 sec. 5 T29N R14W, 13 June 1961, *Redfearn 8330* (MO 5644987). **NEBRASKA:** GARDEN CO.: Ash Hollow State

Historical Park, along ridge on E side of Windlass Hill, E of Oregon Trail, on soil in juniper woodland, 41.260520, -102.113054, 27 July 2017, *Brinda 10057* (MO 7036405). **OHIO:** OTTAWA CO.: Lakeside Daisy State Nature Preserve, ca. 2 km SE of Lakeside, limestone glade and adjacent woodland, on soil, 41.532031, -82.725419, 5 June 2018, *Brinda 12037* (MO 7036406).

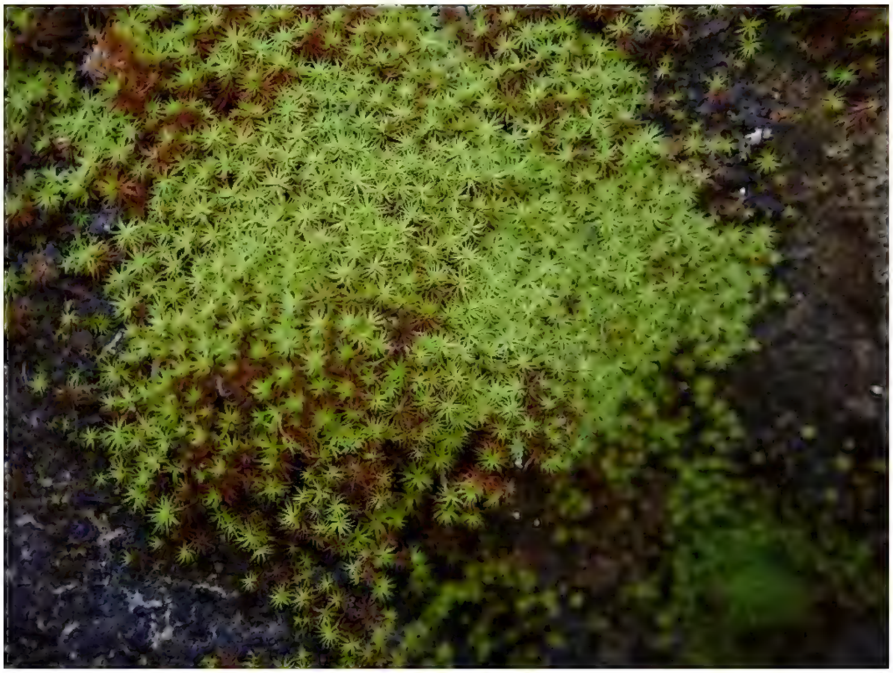

Figure 3. *Trichostomum crispulum* from *Brinda et al. 14658*, Shannon County, Missouri. Photo by John C. Brinda.

Zygodon rupestris Schimp. *ex* Lorentz

This small, widespread species has a scattered distribution in eastern and interior North America ranging from New Brunswick to North Carolina and Tennessee, west to Ontario and Wisconsin (Vitt 1970). *Zygodon apiculatus* Redf. is the only other member of the genus known from Missouri (Redfearn 1967). *Zygodon rupestris* is similar to *Z. apiculatus* in having lanceolate leaves with short apiculi of multiple, concolorous cells; pluripapillose upper and median leaf cells; papillose cells covering the upper abaxial surface of the costae; and ovate to cylindric, multicellular gemmae with horizontal cell walls. Although Vitt (2014) reduced *Z. apiculatus* to the synonymy of *Z. rupestris*, we do not agree. *Zygodon rupestris* is distinguished from *Z. apiculatus* by its more gregarious habit; larger stature (8–20 vs. 0.5–5 mm); and entire versus irregularly serrulate apical leaf margins.

Voucher Specimen: **U.S.A. MISSOURI:** SULLIVAN CO.: Union Ridge Conservation Area, Dark Hollow Natural Area, along draw NE of parking area, tree base in hardwood forest, 40.322500, -92.934122, 1 Sept. 2014, *Brinda 6625* (MO 7036400).

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Botanical inventory of early successional species following pipeline construction along a dynamic urban creek

OWEN KATHRINER[1] AND JAMES FAUPEL[2]

ABSTRACT. — Following the installation of a large sewer pipeline on the property of the Litzsinger Road Ecology Center in St. Louis County, Missouri, restoration staff began a floristic survey of early successional species colonizing the deconstructed soils. Included are the results and analysis from that survey, an annotated table containing the full species list, data from prior floristic surveys, as well as descriptions of the habitat, soils, and construction project at the site. During the first growing season, total mean C-value and native mean C-value were both significantly lower within the pipeline path than in adjacent reconstructed habitats.

INTRODUCTION

In September 2019, the Metropolitan Sewer District of St. Louis (MSD) began construction of a sewage pipeline running through the 15.7 hectare (39 acre) property of the Litzsinger Road Ecology Center (LREC), an educational facility of the Missouri Botanical Garden. This 0.8 kilometer (0.5 mile) long pipeline construction path would ultimately remove all of the pre-existing plant cover from a 2 hectare (5 acre) area along Deer Creek. Both bottomland woodland restoration and bottomland prairie reconstruction habitat types at the LREC were heavily altered during this construction process. The prairie habitat reconstructions at the LREC began in 1989, making them some of the oldest prairie reconstructions in the St. Louis region. Once all vegetation was removed from the surface of this path, excavation of deep trenches began, followed by dynamiting of the limestone bedrock (ca. 15 ft of soil and 10 ft of bedrock, according to MSD). The resulting homogenized piles of all the soil horizons and pulverized bedrock were later backfilled into the 7.62 m (25 ft) deep trenches on top of the new sewer pipe. This resulted in a very different soil structure for the developing roots of the future plantings planned for this area.

In early 2019, prior to the beginning of the sewer project, LREC staff and volunteers conducted a woody plant inventory along the proposed pipeline path through the property. Pipeline construction activities resulted in the removal of 746 native trees and shrubs representing 41 different native species. Of these 746 woody plants, 289 were larger trees >15 cm (6 in) DBH that comprised the woodland canopy. The 289 canopy trees alone were valued by the U.S. Forest Service at a replacement rate of over $500,000, and ecologically they were an invaluable resource of food and shelter for wildlife (Faupel 2019, 2021).

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Additionally, the Institute of Botanical Training (IBT) conducted a botanical inventory of the area during three visits in the 2019 growing season. Their goal was to survey for plant species present in the various habitats onsite at the LREC, including the area of the proposed pipeline. These surveys documented 388 total plant species, 318 of which were native to Missouri (Thomas & Budach, 2019). Through additional botanical surveys by staff at the LREC following the IBT inventory, we believe we have closer to 450+ total plant species onsite.

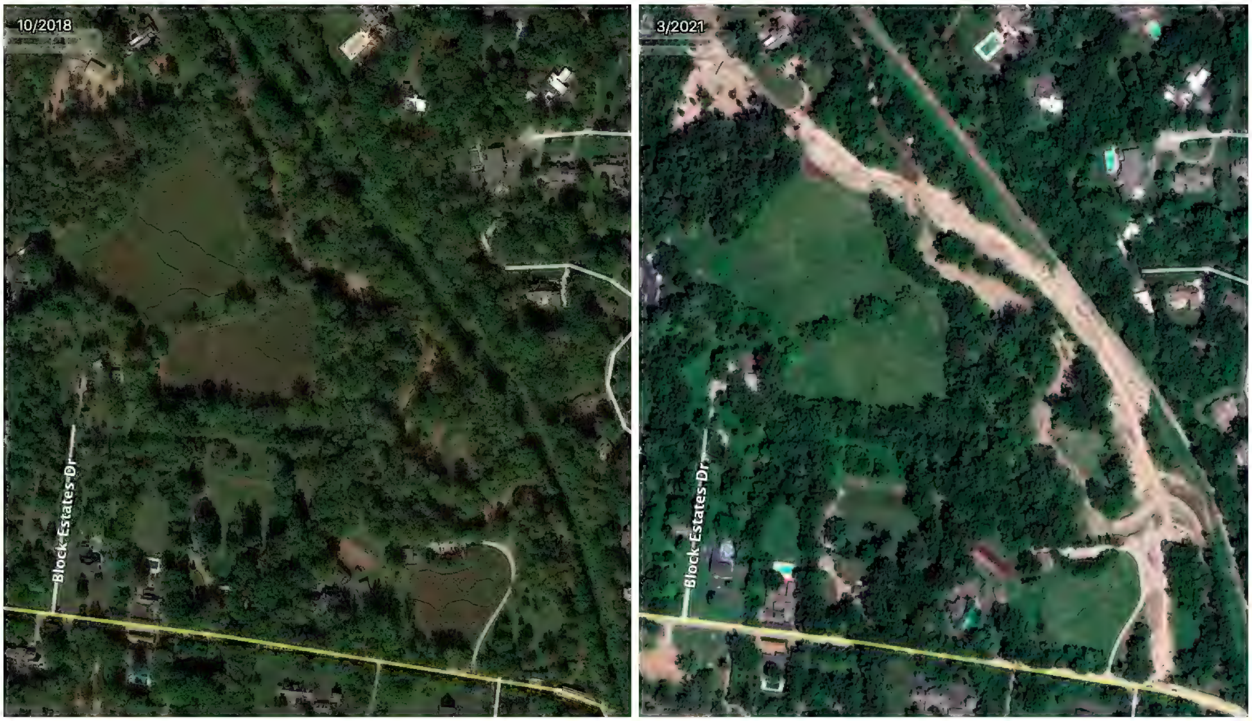

Figure 1. Before and after the 0.8 km (0.5 mile) MSD pipeline construction path on the property of the LREC. Left: October 2018, right: March 2021 (Google Earth 2019, 2021).

Heavy disturbance within the construction path primarily ended by the spring of 2022, allowing for plants to begin colonizing the overturned soil throughout the 2022 growing season. Soil samples were taken in the summer of 2022 by interns Clara Barton, the senior author, and contracted geologist Scott George. Barton compared 2022 soil sample results with baseline soil samples taken by George in 2019, prior to the construction of the MSD path.

Barton found that many significant changes have occurred to the soil, which will have tremendous impacts on any plants that attempt to grow within the path. Some of the most important changes were the severe drops in available minerals necessary for plant growth, specifically nitrogen, phosphorus, and potassium. Additionally, there was an increase in soil alkalinity (pH) and a considerable drop in cation exchange capacity (CEC), both of which will directly hinder plants' abilities to access needed nutrients. Severe soil compaction has left the construction path with wetland-like soils/growing conditions (low pore space and oxygen, reduced water infiltration and drainage). However, the riparian bottomlands of the LREC dry out more frequently than a wetland would naturally in summer. Lastly, all microbial soil samples from within this deconstructed soil showed that microbial life was almost non-existent, resulting in a collapsed soil food web that will take years to recover (Barton 2022). These unnatural growing conditions will likely benefit exotic "weedy" species that are prolific in our urban landscape. Compact urban soil conditions can lead to the less aggressive native plant species being selected out over time, as they do not have the capability to adapt to survive such irregular fluctuations in soil moisture that is common in a growing urban environment.

The two previously mentioned 2019 plant inventories can serve as a baseline plant list against which to compare future habitat reconstruction of the pipeline path; however, taking into account how much the soil composition has changed, all of the same pre-existing plant species will likely never be successfully reintroduced in such growing conditions in our lifetimes. Initial plant community reconstruction work within the path will begin with seeding a mix of annual grasses, turnips, legumes, and mustards as cover crops for two growing seasons, to start the process of breaking up the soil compaction and reintroducing organic material into the soil in hopes of restarting microbial activity.

The purpose of this 2022 inventory was to survey and catalog all early successional vascular plant species occurring within the boundaries of the MSD pipeline construction path during its first growing season, post major disturbances, and before any grassland reconstruction work by the LREC staff begins. This flora checklist will act as the new baseline for the present disrupted soil conditions.

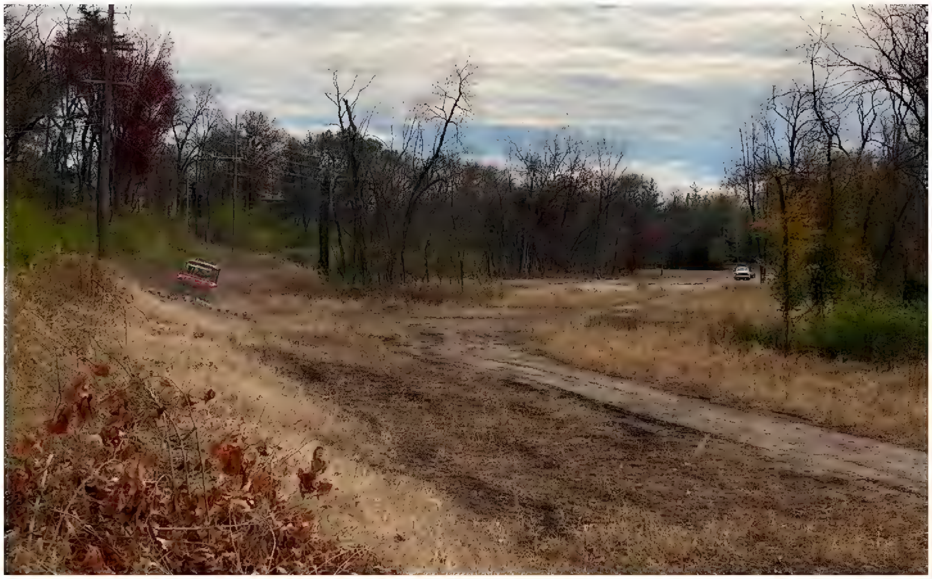

Figure 2. View of the riparian pipeline path. Once covered by woodland tree canopy, it is now colonized by early successional species after one growing season. Photo by James Faupel.

METHODS

Floristic surveys of the MSD path were conducted by LREC staff. The MSD path was broken into three sections based upon its two intersections with Deer Creek, and these were surveyed on August 17-19, 2022. Each survey was a thorough, *systematic meander* (Thomas & Budach 2019) consisting of walking the site in a row-by-row fashion to visually survey the entire site. Plant species that could not be identified in the field were collected for later identification by the senior author using Steyermark's *Flora of Missouri* (Yatskievych 1999, 2006, 2013). Several follow-up walkthroughs were conducted in the ensuing weeks to confirm identifications and finalize additions to the species list.

Upon compiling the final list of species present at the site, the *Ecological Checklist of the Missouri Flora for Floristic Quality Assessment* (Ladd & Thomas 2015) was referenced for conservatism rankings (C-values), wetness index values, nomenclature, and other relevant ecological information. A general floristic quality assessment (FQA) was completed from these C-values (**Table 1**). Ecological values were used to assess relative proportions of relevant functional/ecological groups within this plant community (**Tables 2** & **3**). The total species list (**Table 4**) is arranged by scientific name and includes life-cycle type, physiognomic class, W-value, and C-value for each species.

RESULTS AND DISCUSSION

The 2022 survey of the MSD pipeline path documented 141 plant species. Native plants comprised 69.50% of this total at 98 species, and introduced plants comprised 30.50% at 43 species. Although there were more native species than exotics in our survey area, we observed that exotic species likely outnumbered natives by abundance. Unfortunately, abundance was not measured for this report. *Echinochloa crus-galli*, an exotic barnyard grass, was observed to be among the most dominant and abundant graminoid species throughout the site, and covered approximately 80-90% of the soil surface. Total mean C-value of the pipeline path (including introduced plants) was 1.7. The mean native C-value (excluding introduced plants) was 2.5. For comparison, the data from the 2019 IBT survey showed the mean C-value of the restored woodlands and reconstructed prairies adjacent to the pipeline path (including introduced plants) was 3.2, while the mean native C-value (excluding introduced plants) was 3.9 (Thomas & Budach 2019).

The total destruction of the preexisting plant community within the MSD path means the plant community there is fundamentally different from elsewhere within the LREC property. In general, sites with mean C-values of at least 3.5 are considered to retain remnant ecological integrity worthy of preservation (Thomas & Budach 2019). The relatively low total mean C-value of 1.7 within the recently disrupted MSD path suggests the ruderal character of this plant community. It is worth noting that this species list is approximate, especially for such a dynamic and early-successional plant community. It is also possible that some spring/early summer flora was missed due to the late summer timeframe of this floristic survey.

One major concern following this pipeline's completion is that it has allowed an easy access point for additional exotic invasive plant species to begin colonizing restored habitats at the LREC. This survey did record a handful of new invasive species to the site, such as *Phragmites australis*, that could cause long term problems for ecological restoration efforts. Continuing the floristic surveys of this area in the future will not only be of botanical interest to students and staff, but will also provide invaluable information to maintain the land management mission of the Missouri Botanical Garden at the LREC.

More data needs to be collected and available from early successional systems in the region. Future LREC interns and staff will have the opportunity to repeat this survey's methods in future years, to watch and learn from this dynamic habitat reconstruction that will remain highly influenced by seed pressures of the surrounding invasive species, urban isolation, and disturbance history. Future floristic survey data will continue to be shared publicly.

Table 1. Floristic Quality Assessment for MSD pipeline construction path on the property of LREC.

	Species	**Mean C-value**
All taxa	141	1.7
Native taxa	98	2.5

Table 2. Number and percentage of species by nativity, life cycle strategy, and relevant physiognomic class.

Life cycle strategy:

	Native		**Introduced**		**Combined**	
Annual/biennial	37	26.24%	26	18.44%	63	44.68%
Perennial	61	43.26%	17	12.06%	78	55.32%

Physiognomic class:

	Native		**Introduced**		**Combined**	
Forb	65	46.10%	28	19.86%	93	65.96%
Grass	13	9.22%	11	7.80%	24	17.02%
Sedge	8	5.67%	1	0.71%	9	6.38%
Shrub	0	0.00%	1	0.71%	1	0.71%
Tree	9	6.38%	2	1.42%	11	7.80%
Woody vine	3	2.13%	0	0.00%	3	2.13%

Table 3. Number and percentage of species by wetness rating (W). Wetness designations denote species' overall ecological pattern and were assigned by Lichvar (2012, 2013) for wetland delineation purposes. Because wetness designations can vary between regions, we used W-values for Missouri from Ladd & Thomas (2015). Each species is assigned one of five wetness designations: obligate wetland (OBL), facultative wetland (FACW), facultative (FAC), facultative upland (FACU) or upland (UPL) (Lichvar 2012, 2013).

Wetness Rating	**Native**		**Introduced**		**Combined**	
OBL	21	14.89%	0	0%	21	14.89%
FACW	24	17.02%	4	3%	28	19.86%
FAC	21	14.89%	6	4%	27	19.15%
FACU	27	19.15%	26	18%	53	37.59%
UPL	4	2.84%	7	5%	11	7.80%

Table 4. Project area flora arranged alphabetically by scientific name, with Conservatism rankings (C), life-cycle/physiognomy (PHYSIOG), wetness index values (W), and common names. Exotic species are denoted with a [*] in the C column. This table uses ratings from Ladd & Thomas (2015). Annuals, perennials, and biennials are denoted A-, P-, and B-, respectively under the physiognomy column. Relevant physiognomic classes include forbs (FORB), grasses (GRASS), sedges (SEDGE), shrubs (SHRUB), trees (TREE), and woody vines (W-VINE).

C	**SCIENTIFIC NAME**	**PHYSIOG**	**W**	**COMMON NAME**
*	*Abutilon theophrasti*	A-FORB	FACU	velvetleaf
1	*Acalypha rhomboidea*	A-FORB	FACU	three-seed mercury
1	*Acer negundo*	TREE	FAC	boxelder
2	*Acer saccharinum*	TREE	FACW	silver maple
*	*Albizia julibrissin*	TREE	UPL	mimosa tree
0	*Amaranthus tuberculatus*	A-FORB	FACW	roughfruit amaranth
0	*Ambrosia artemisiifolia*	A-FORB	FACU	annual ragweed
0	*Ambrosia trifida*	A-FORB	FAC	giant ragweed
6	*Ammannia coccinea*	A-FORB	OBL	scarlet toothcup
5	*Andropogon gerardii*	P-GRASS	FAC	big bluestem
3	*Apocynum cannabinum*	P-FORB	FACU	dogbane
4	*Arnoglossum atriplicifolium*	P-FORB	UPL	pale Indian plantain
*	*Artemisia annua*	A-FORB	FACU	annual wormwood
*	*Artemisia vulgaris*	P-FORB	UPL	mugwort
1	*Bidens aristosa*	A-FORB	FACW	swamp marigold
2	*Bidens frondosa*	A-FORB	FACW	beggarticks
4	*Campanula americana*	A/B-FORB	FAC	tall bellflower
2	*Carex blanda*	P-SEDGE	FAC	common wood sedge
2	*Carex frankii*	P-SEDGE	FAC	Frank's sedge
2	*Catalpa speciosa*	TREE	FACU	Northern catalpa

C	SCIENTIFIC NAME	PHYSIOG	W	COMMON NAME
2	*Chamaecrista fasciculata*	A-FORB	FACU	partridge pea
4	*Chasmanthium latifolium*	P-GRASS	FAC	creek oats
*	*Chenopodium album*	A-FORB	FACU	white goosefoot
*	*Cichorium intybus*	P-FORB	FACU	chicory
*	*Commelina communis*	A-FORB	FAC	Asiatic dayflower
*	*Commelina diffusa*	A-FORB	FACW	climbing dayflower
3	*Conoclinium coelestinum*	P-FORB	FAC	blue mistflower
4	*Cuscuta campestris*	A-FORB	UPL	field dodder
*	*Cynodon dactylon*	P-GRASS	FACU	bermudagrass
*	*Cyperus esculentus*	P-SEDGE	FACW	yellow nutsedge
3	*Cyperus squarrosus*	A-SEDGE	OBL	bearded flatsedge
1	*Cyperus strigosus*	P-SEDGE	FACW	straw-colored flatsedge
3	*Desmanthus illinoensis*	P-FORB	FACU	Illinois bundleflower
3	*Desmodium paniculatum*	P-FORB	FACU	panicledleaf tick trefoil
4	*Dichanthelium clandestinum*	P-GRASS	FACW	deertongue
	Dichanthelium sp.	P-GRASS	---	rosette panicgrass
*	*Digitaria ischaemum*	A-GRASS	FACU	smooth crabgrass
*	*Digitaria sanguinalis*	A-GRASS	FACU	large crabgrass
*	*Echinochloa crus-galli*	A-GRASS	FAC	barnyard grass
2	*Echinochloa muricata*	A-GRASS	OBL	rough barnyard grass
3	*Eclipta prostrata*	A-FORB	FACW	false daisy
*	*Eleusine indica*	A-GRASS	FACU	goosegrass
5	*Elymus canadensis*	P-GRASS	FACU	Canada wild rye
7	*Elymus riparius*	P-GRASS	FACW	riverbank wild rye
*	*Eragrostis minor*	A-GRASS	UPL	little lovegrass
1	*Erechtites hierarchiifolius*	A-FORB	UPL	fireweed
1	*Erigeron annuus*	A-FORB	FACU	annual fleabane
0	*Erigeron canadensis*	A-FORB	FACU	horseweed
1	*Eupatorium serotinum*	P-FORB	FAC	late boneset
3	*Euphorbia humistrata*	A-FORB	FAC	spreading spurge
0	*Euphorbia maculata*	A-FORB	FACU	spotted spurge
0	*Euphorbia nutans*	A-FORB	FACU	nodding spurge
*	*Euphorbia prostrata*	A-FORB	FACU	prostrate spurge
3	*Euthamia graminifolia*	P-FORB	FAC	grass leaved goldenrod
5	*Fimbristylis autumnalis*	A-SEDGE	FACW	slender fimbry
2	*Fraxinus pensylvanica*	TREE	FACW	green ash
*	*Glechoma hederacea*	P-FORB	FACU	ground ivy
5	*Helenium autumnale*	P-FORB	FACW	sneezeweed

C	SCIENTIFIC NAME	PHYSIOG	W	COMMON NAME
4	*Hibiscus laevis*	P-FORB	OBL	halberdleaf rosemallow
5	*Hibiscus lasiocarpos*	P-FORB	OBL	woolly rosemallow
*	*Humulus japonicus*	A-FORB	FACU	Japanese hops
3	*Hypericum punctatum*	P-FORB	FAC	spotted St. John's wort
*	*Ipomoea hederacea*	A-FORB	FACU	ivy-leaved morning glory
*	*Kummerowia striata*	A-FORB	FACU	Japanese clover
3	*Lactuca canadensis*	B-FORB	FACU	Canada lettuce
3	*Leersia oryzoides*	P-GRASS	OBL	rice cutgrass
0	*Lepidium virginicum*	A/B-FORB	FACU	pepperweed
*	*Lespedeza cuneata*	P-FORB	FACU	Chinese bushclover
3	*Leucospora multifida*	A-FORB	FACW	obi wan conobea
4	*Lindernia dubia* var. *anadallidea*	A-FORB	OBL	false pimpernel
4	*Lobelia siphilitica*	P-FORB	OBL	blue lobelia
*	*Lonicera japonica*	P-FORB	FACU	Japanese honeysuckle
*	*Lonicera maackii*	SHRUB	UPL	Amur bush honeysuckle
3	*Ludwigia peploides*	P-FORB	OBL	water primrose
6	*Lythrum alatum*	P-FORB	OBL	winged loosestrife
*	*Melilotus albus*	A/B-FORB	FACU	white sweetclover
*	*Mollugo verticillata*	A-FORB	FAC	carpetweed
0	*Oenothera biennis*	B-FORB	FACU	evening primrose
0	*Oxalis stricta s.l.*	P-FORB	FACU	yellow woodsorrel
0	*Panicum capillare*	A-GRASS	FAC	witch grass
0	*Panicum dichotomiflorum*	A-GRASS	FACW	fall panicgrass
3	*Parthenocissus quinquefolius*	W-VINE	FACU	Virginia creeper
3	*Paspalum pubiflorum*	P-GRASS	FAC	hairy-seed bead grass
3	*Penthorum sedoides*	P-FORB	OBL	ditch stonecrop
*	*Perilla frutescens*	A-FORB	FAC	beefsteak plant
4	*Persicaria hydropiperoides*	P-FORB	OBL	wild water pepper
0	*Persicaria lapathifolia*	A-FORB	FAC	heartsease
*	*Persicaria longiseta*	A-FORB	FACU	Oriental lady's thumb
*	*Persicaria maculosa*	A-FORB	FACW	spotted lady's thumb
1	*Persicaria pensylvanica*	A-FORB	FACW	Pennsylvania smartweed
3	*Persicaria punctata*	P-FORB	OBL	dotted smartweed
*	*Phragmites australis*	P-GRASS	FACW	common reed
3	*Phyla lanceolata*	P-FORB	OBL	fogfruit
2	*Phytolacca americana*	A-FORB	FACU	pokeweed
4	*Pilea pumila*	A-FORB	FACW	clearweed
*	*Plantago lanceolata*	P-FORB	FACU	lance leaf plantain

C	SCIENTIFIC NAME	PHYSIOG	W	COMMON NAME
0	*Plantago rugellii*	P-FORB	FAC	Rugel's plantain
3	*Platanus occidentalis*	TREE	FACW	American sycamore
*	*Polygonum aviculare*	A-FORB	FACU	low knotweed
2	*Populus deltoides*	TREE	FAC	cottonwood
0	*Portulaca oleracea*	A-FORB	FACU	purslane
*	*Robinia pseudoacacia*	TREE	FACU	black locust
4	*Rotala ramosior*	A-FORB	OBL	toothcup
1	*Rudbeckia hirta*	B-FORB	FACU	black eyed Susan
5	*Rudbeckia subtomentosa*	P-FORB	FACU	sweet coneflower
2	*Rumex altissimus*	P-FORB	FACW	tall dock
*	*Rumex crispus*	P-FORB	FAC	curly dock
4	*Sagittaria latifolia*	P-FORB	OBL	broadleaf arrowhead
3	*Salix interior*	TREE	FACW	sandbar willow
2	*Salix nigra*	TREE	OBL	black willow
5	*Schoenoplectus tabernaemontani*	P-SEDGE	OBL	soft stemmed bulrush
3	*Scirpus atrovirens*	P-SEDGE	OBL	dark green bulrush
5	*Scirpus pendulus*	P-SEDGE	OBL	nodding bulrush
3	*Scrophularia marilandica*	P-FORB	FACU	late figwort
4	*Senna marilandica*	P-FORB	FAC	wild senna
*	*Setaria faberi*	A-GRASS	FACU	nodding foxtail
*	*Setaria pumila*	A-GRASS	FAC	yellow foxtail
*	*Setaria viridis*	A-GRASS	UPL	green foxtail
*	*Sida spinosa*	A-FORB	FACU	prickly sida
0	*Solanum carolinense*	P-FORB	FACU	Carolina horsenettle
*	*Solanum lycopersicum*	A-FORB	UPL	tomato
1	*Solanum ptychanthum*	A-FORB	FACU	American black nightshade
1	*Solidago altissima*	P-FORB	FACU	tall goldenrod
3	*Solidago gigantea*	P-FORB	FACW	goldenrod
*	*Sorghum halepense*	P-GRASS	FACU	Johnsongrass
2	*Strophostyles leiospermum*	A-FORB	UPL	small fuzzy bean
3	*Symphyotrichum lanceolatum*	P-FORB	FACW	lance-leaf aster
3	*Symphyotrichum lateriflorum*	P-FORB	FACW	side-flowering aster
*	*Taraxacum officinale*	P-FORB	FACU	dandelion
2	*Teucrium canadense*	P-FORB	FACW	germander
1	*Tridens flavus*	P-GRASS	FACU	purpletop tridens
*	*Trifolium hyrbidum*	P-FORB	FACU	Alsike clover
*	*Trifolium repens*	P-FORB	FACU	white clover
0	*Typha angustifolia*	P-GRASS	OBL	cattail

C	SCIENTIFIC NAME	PHYSIOG	W	COMMON NAME
	Ulmus sp.	TREE	FAC	elm
*	*Verbascum thaspus*	B-FORB	UPL	mullein
2	*Verbena urticifolia*	P-FORB	FAC	nettle leaved vervain
4	*Verbesina alternifolia*	P-FORB	FACW	wingstem
3	*Vitis cinerea*	W-VINE	FACU	graybark grape
4	*Vitis riparia*	W-VINE	FACW	frost grape
0	*Xanthium strumarium*	A-FORB	FAC	rough cocklebur

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Flora and natural communities of Bryant Creek State Park, Douglas County, Missouri

PAUL W. NELSON[1]

ABSTRACT. — An intensive field inventory of the 2,927-acre Bryant Creek State Park in Douglas County documented 940 taxa of vascular plants, including 801 native taxa, in 32 natural community types. Thirteen species of conservation concern and a new state record are reported. Detailed natural community descriptions, numerous images and graphs, and analysis of the data are presented, as well as a discussion of factors resulting in the exceptional level of floristic diversity.

SUMMARY

From February through October 2020, I conducted a botanical study of the 2,927-acre Bryant Creek State Park in Douglas County, making 12 trips for a total of 49 field days at the site. Thirty-two natural communities and distinctive geologic/physical variations within them were identified on field maps and became the blueprint for structuring successive field itineraries. As the project progressed through mid-summer, a major revelation emerged. The number of vascular species was trending toward a landmark high total. On September 22, nine experienced botanists embarked on a day-long float trip at the site, with a mission to help surpass the record 917 plant taxa that has stood for over 40 years at Johnson's Shut-Ins State Park (Nelson 1977 and subsequent field work). We achieved the goal, documenting 940 taxa.

The 940 taxa comprise 116 plant families representing 361 genera. Of the total number of species, 801 are native (85 percent) with 139 introduced. The flora includes 13 species of conservation concern, including *Micranthes palmeri*, a new state record. This report describes the flora associated with the park's natural communities, and variations in landscape features contributing to this high species diversity. In addition, the ratio of native species to the low number of introduced species is reflected in the quality of the natural communities across the landscape.

This paper is adapted from a report presented to Missouri Department of Natural Resources (DNR) (Nelson 2021); other products from the project include an electronic database with 940 documented plant taxa, 10 Element Occurrence Records (EOR) and EOR shapefile data for locations of select conservative, rare, and exotic plant species, 34 herbarium specimens deposited at the Missouri State Parks Herbarium (MODNR), and numerous digital images of natural communities, habitats, and plant species.

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STUDY OBJECTIVE

The primary objective of this study was to record at least 80 percent of the total vascular plant species occurring in Bryant Creek State Park during the 2020 growing season. For comparative purposes, I examined comprehensive floristic studies from other sites in Missouri. **Table 1** (modified from Yatskievych 1999) enumerates studies considered to be comprehensive given the intensity of collecting and the experience/persistence of the practitioners. These works are listed in descending order of total collected or observed plant taxa. Excluding this study and the Shepherd of the Hills report, note that the most diverse sites span study intervals from 5 years for Doug Ladd at Bennett Spring State Park, to over 40 years for both Bruce Schuette at Cuivre River State Park, and the author for Johnson's Shut-Ins State Park. Confidence is high that the data for these these three sites captures >95 percent of the plant species occurring in the respective state park at the time of the study.

Table 1. Selected comparative and comprehensive Missouri floristic studies in relationship to the flora of Bryant Creek State Park, in desending order of total taxa per site.

Site	Acres	Investigator & Year	Taxa
Bryant Creek State Park, Douglas Co.	2,927	Nelson 2020***	940
Johnson's Shut-Ins State Park, Reynolds Co.	2,386	Nelson 1977*	917
Cuivre River State Park, Lincoln Co.	6,632	Schuette 2020**	823
Shepherd of the Hills State Park, Taney Co.	1,100	Nelson 2019***	741
Bennett Spring State Park, Dallas & Laclede cos.	1,221	Ladd 1985**	712
Roaring River State Park, Barry Co.	4,091	Hornberger 1980*	667
Hawn State Park, Ste. Genevieve Co.	3,271	Solecki 1981*	661
Montauk State Park, Dent Co.	2,141	Maupin 1975*	625
Piney Creek Wilderness, Barry & Stone cos.	8,178	Rebman 1989*	606
Jonca Creek, Ste. Genevieve co.	400	Taylor 1972*	534
Knob Noster State Park, Johnson Co.	3,661	Mullikin 1977*	517
Big Oak Tree State Park, Mississippi Co.	1,043	Doolen 1984*	230

*Master's thesis. **Personal observations by DNR naturalists, including Ladd's 720 collections from Bennett Spring State Park (MODNR; note that the park has since expanded to 3,217 acres), and Schuette's 930 collections from Cuivre River State Park (MODNR). ***Nelson completed the Flora of Shepherd of the Hills (formerly Ozark Mountain) State Park in 2019. Acres given reflect the area's size at the time of the study. Taxa refer to plant species, varieties, and hybrids.

METHODS

All observed vascular taxa from Bryant Creek State Park were entered into a Microsoft Access database. The database includes separate fields for the natural communities, habitats, and cultural areas, as well as information on plant species abundance in natural communities. The Access database (also transferable to Microsoft Excel) lists all observed vascular plant species along with the following information:

a. Scientific name and common name (based on DNR herbarium nomenclature)
b. Plant family name

c. Six letter acronyms from Ladd & Thomas (2015)
d. Qualitative assessment of abundance and distribution (see Appendix)
e. Natural community or human disturbance habitat
f. C-value (From Ladd & Thomas 2015)
g. S-Rank (Missouri Species of Conservation Concern, 2021)
h. Wetness (From Ladd & Thomas 2015)
i. Comments by the author

Taxonomy and nomenclature followed the 2017 master DNR herbarium plant database unless otherwise cited; this taxonomy is based on Yatskievych (1999, 2006, 2013) with some taxonomic changes following Ladd & Thomas (2015). As vascular plant nomenclature is a constantly changing target, the primary source for updates on Missouri plant taxonomy is the Flora of Missouri Project (http://www.mobot.org/mobot/missouri/) under the direction of Aaron Floden of the Missouri Botanical Garden.

I conducted twelve field trips between February 18 and October 11, 2020, spending a total of 49 field days botanizing Bryant Creek State Park. I systematically traversed the park's varied terrain, including most ridges, north and south-facing hillslopes, ravines, cliffs, and the entire lengths of the streams/drainages of Pike, Turkey Flat, Shiloh, West, and Central hollows. Tracing the routes over the sequence of field days permitted me to become familiar with the park's natural communities, habitat/niche variations within them, and anthropogenically disturbed areas. During the traversals I accrued locations for the full array of representative natural communities, and the range of distinctive floristic areas (especially higher quality locations). I subsequently designed a field inventory visitation/sampling schedule that best captures the full spectrum of flora associated with the park's distinctive natural communities. Sampling routes included repeat visits to target areas thought to harbor assemblages of distinctive plant communities. Adjustments were necessary as the season progressed. I spent significant time throughout the flowering season recording plant species for natural communities emphasized for restoration. I took all the images in this paper unless otherwise credited.

Notes were recorded on field sheets for plant taxa identified in various locations, along with distribution, abundance (see Appendix), and natural community notations. Concurrent with making field notations, I collected many plant specimens, placing them in bags, storing them in coolers on site for later identification. In addition to the keys found in Yatskievych, I employed the keys for *Dichanthelium* and *Muhlenbergia* by Thomas (2003, 2015).

I accessed the Universal FQA Calculator website (https://universalfqa.org/) to examine the plant lists for the nine plots established by Justin Thomas. Chris Crabtree entered the plot data into the FQA database. I also accessed the Missouri Department of Conservation's Natural Heritage Program data to develop a local search list of possible locations for Element Occurrence Records.

Two float trips were made on Bryant Creek from an access point on Jack and Florice Pearce's property, downstream through the 1.7 miles of state park land bordering Bryant Creek, ending 3.6 miles downstream at the N-345 County Road bridge. On the first trip in late July, Chris Crabtree and I recorded over 60 species along the stream corridor. On September 22, I accompanied nine others on a botanical foray float along the same route; we added 38 riparian plant species to the total park list.

NATURAL COMMUNITIES AND HABITATS

This paper describes the flora associated with 30 distinct natural communities in Bryant Creek State Park. Natural communities follow the descriptions from my Terrestrial Natural Communities of Missouri (Nelson 2010). Distinct assemblages of native plants (along with animals and microorganisms) occur in repeatable patterns across the park landscape in response to patterns of environmental attributes including soil moisture, geology, hydrology, topography, natural disturbance processes, and vegetation structure. Ideally, high quality natural communities contain assemblages of plant species associations, relative abundance, and structural characteristics thought to occur prior to European settlement.

Missouri State Park natural resource experts are keenly aware of the differences between desired high-quality native plant assemblages, and the system impacted by threats that degrade and destabilize them. These differences should be self-evident when assessing vegetation quality and natural community character at Bryant Creek State Park. Fortunately, based on the observations on the abundance, distribution, and patterns of the flora recorded at Bryant Creek State Park, a high degree of natural integrity occurs within many natural communities. This should facilitate ecological restoration efforts moving plant populations toward their historic variety, numbers, and relative importance.

Four factors help to explain the high plant species diversity associated with the park’s 32 natural communities. First, the park is dissected by three distinct geologic formations, producing a broad range of acidic and alkaline rock and soil conditions. Of special significance are the natural communities and geologic features associated with the park’s premiere sandstone outcrops of the Roubidoux Formation. Second, these geologic units produce a variety of exposed rock formations and soils across a wide range of slopes, aspects, elevations, and hydrology. Third, the park’s topography is dissected by numerous gaining and losing streams, and the larger river-like Bryant Creek. Unlike smaller streams and drainages, Bryant Creek brings to the park the characteristics of an entrenched and partially meandering riverine drainage system. Functioning more like a maturing river, Bryant Creek’s floodplain and streambed vegetation is strongly influenced by frequent floods that shape and change the channel location, along with a wide range of variable riparian habitats. Frequent floods transport silt, sand, gravel, and debris creating open sand deposits in riverfront forests, sand and gravel bars, sloughs, abrupt forested streambanks, slack water mudflats, and small marshes.

Another fortunate contribution in achieving high plant species diversity is a result of the initial selection process for a new state park. Selection criteria including size, location, habitat quality, and landscape variation are critical for capturing high plant and animal species diversity.

Additionally, the region's landscape characteristics offer qualities unique and distinct to the state park system.

Soils

The USDA Natural Resources Conservation Service Missouri Web Soil Survey (https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm) provides information for soil maps and descriptions. Soil attributes including soil chemistry, profiles, permeability, moisture, acidity, and parent material are all the foundation for describing distinctive natural communities. **Table 2** lists the soils, their parent material residuum, and primary natural communities.

Table 2. Soils of Bryant Creek State Park

SOILS OF UPLAND RIDGES, FLATS, AND HIGH SHOULDERS		
Soil Unit(s)	**Forms over**	**Primary natural community**
Mano-Ocie	Weathered Dolomite	Dry chert woodlands
Gatewood-Moko	Weathered Dolomite	Dry dolomite woodland; some glade
Moko	Shallow dolomite	Dolomite glade
Ocie-Gatewood	Dolomite and chert	Dry and dry-mesic chert and dolomite woodland
Poyner, Tonti, Scholten	Deep chert over dolomite	Dry-mesic chert woodland
Fanchon	Fragipan and Loess	Dry woodland and flatwoods
SOILS OF SLOPES AND HOLLOWS		
Soil Unit(s)	**Forms over**	**Primary natural community**
Coulstone	Sandstone residuum/ gravelly slope alluvium	Dry and dry-mesic sandstone woodland; dry-mesic sandstone forest; dry-mesic chert forest, mesic sandstone forest
Bender	Sandstone residuum	Dry and dry-mesic sandstone woodland and forest
Topazmill-Coustone	Slope alluvium	Dry-mesic woodland
Bendavis	Slope alluvium over chert	Dry and dry-mesic chert woodland
Coulstone/Bender/ Gatewood	Bluffs and hillslopes of Bryant Creek	Dry-mesic sandstone forest, dry dolomite cliff, mesic dolomite forest, dolomite talus
SOILS OF BRYANT CREEK BOTTOMLANDS		
Soil Unit(s)	**Forms over**	**Primary natural community**
Relf and Sandbur complex	Sandy and gravelly alluvium	Dry-mesic and mesic bottomland forest; riverfront forest, sand and gravel bars

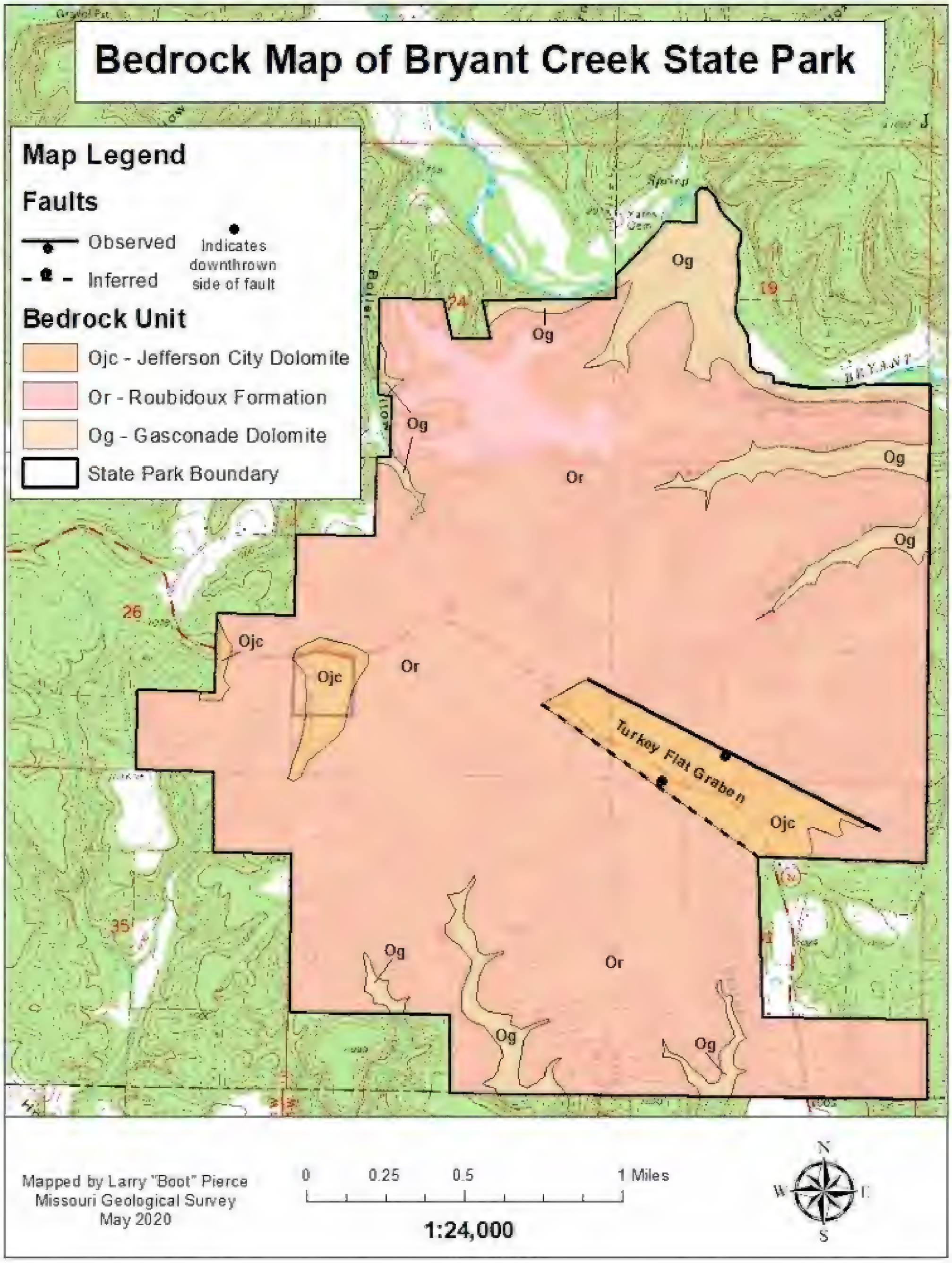

Figure 1. Bedrock geology superimposed over topography. The predominant Roubidoux Formation is critical to the location of the many mesic sandstone ravines harboring hanging sandstone waterfalls, moist and dry sandstone ledges, and spicebush seeps. Dolomite glades and dolomite woodlands occupy the Jefferson City Dolomite, and dry-moist dolomite cliffs of Coon Den and Pearce bluffs are associated with the Gasconade Dolomite.

Organizing Natural Communities: The Flow of Water

While the 32 natural communities identified at Bryant Creek State Park follow the classification/organization of Nelson (2010), different approaches were considered to explain relationships among flora, natural communities, and the processes responsible for their development. Of all the environmental factors affecting the characteristic flora of natural communities, it is the downward flow and infiltration of water that affect their distributions, patterns, and locations. Precipitation falls across a varied topography mantled in three primary geologic formations. Distinctive plant species sort themselves out across pH gradients — cherts and sandstones producing acidic soils, while calciphiles inhabit higher pH dolomites and karstic groundwaters. Elevation and soils affect infiltration and runoff rates, or lack thereof. Aspect (direction facing toward or away from the sun) determines selection for plants adapted to desiccating exposure of southwest slopes or sheltered in dense tree canopy shade on north-facing protected slopes.

The natural communities of Bryant Creek State Park are organized and sorted (**Table 3**) based on hydrological/elevation flow qualities. Excessively drained soils of glades, dry woodlands, and upland flatwoods occur on hilltops and steep south and west slopes exposed to the direct sun, with soils becoming progressively moister descending into valleys and northerly hillslopes. Excess runoff collects in ravines and stream basins or flows beneath the surface as losing streams. Rainwater penetrates porous substrates until encountering impervious rock, where it exits along hillslopes, bedrock ravines, and valley terraces as seeps, fens, and springs.

Table 3. Natural Communities of Bryant Creek State Park

Natural Community Name	Database Abbreviation	Relative Abundance
UPLAND NATURAL COMMUNITIES		
Dolomite Glade	DG	< 15 acres
Sandstone Glade	SG	< 1 acre
Upland Flatwoods (Dry and Ponding)	UF	Tens of acres
Dry Chert Woodland	DCW	Hundreds of acres
Dry-Mesic Chert Woodland	DMCW	Tens of acres
Dry-Mesic Chert Forest	DMCF	Tens of acres
Dry Sandstone Woodland	DSW	Hundreds of acres
Dry Sandstone Cliff (ledges)	DSC	Estimated total 1 mile
Dry-Mesic Sandstone Woodland	DMSW	Hundreds of acres
Dry-Mesic Sandstone Forest	DMSF	Hundreds of acres
Mesic Sandstone Forest	MSF	Tens of acres
Moist Sandstone Cliff (ledges)	MSC	Estimated total 1.5 miles
Dry Dolomite Woodland	DDW	< 20 acres
Dry Dolomite Cliff	DDC	¼ mile west-facing upper cliff
Dry-Mesic Dolomite Woodland	DMDW	Tens of acres
Mesic Dolomite Forest	MDF	Tens of acres
Dolomite Talus	DT	< 10 acres; ½ mile long
Moist Dolomite Cliff	MDC	¾ mile north-facing lower cliff

Natural Community Name	Database Abbreviation	Relative Abundance
GROUNDWATER NATURAL COMMUNITIES		
Ozark Fen	OF	3 fens
Spicebush Terrace Seep	STS	6-10 large occurrences
Ravine Side slope Seep	RSS	6-8 ravines
Dolomite Spring	DS	5 springs
Sinkhole Pond	SP	1 pond
RIVERINE NATURAL COMMUNITIES		
Dry-Mesic Bottomland Forest	DMBF	< 15 acres
Mesic Bottomland Forest	MBF	< 5 acres
Dry-Mesic Bottomland Woodland	DMBW	Tens of acres
Riverfront Forest	RF	< 20 acres
Gravel Wash-Narrow valleys	GW	> 15 total miles
Gravel bar	GB	< 5 acres
Sandbar	SB	< 2 acres
Mudflat-Slough	MF	> 15 occurrences in 2 miles
Stream/Riverbank	RB	3.5 miles along Bryant Creek

Table 4. Cultural Vegetative Habitats of Bryant Creek State Park

Cultural Habitat Name	Database Abbreviation	Relative Abundance
Abandoned Upland Pasture	AUP (Simpson)	53 acres
Maintained Paved and Gravel Roads	RG	3.5 miles
Logging Roads; Log Landings-Gravel, dirt, mud.	LR	> 6 miles
Homesite, Yard, Stable	HY	2 acres
Artificial Pond	AP	5 ponds

In upper headwaters, springs and rainwater encounter impervious sandstone bedrock and or the water table near the surface. These “gaining streams” collect water in increasing quantities until they encounter pervious deep deposits of gravel, boulders, and weathered bedrock along the stream channel. Surface flows gradually disappear below the stream channel as the water table lowers. These “losing streams” most often occur downstream from headwater valleys in the park. South of Highway N, losing streams are even more pronounced, especially along the main valleys of Dry and Shiloh hollows. Unless replenished by summer rains, nearly every secondary stream in the park becomes seasonally dry, except for a few spring-fed deep ravines. Bryant Creek, a nearly river-sized stream, flows all year, although volume can be very low during droughts; its watershed covers tens of thousands of acres. Floodwaters can submerge the Bryant Creek floodplain from bluff to bluff, often to a depth of 10-15 feet high. Unlike the smaller streams and drainages in the park, Bryant Creek’s meandering stream channel contains nearly all the classic riverine natural communities characteristic of a wide floodplain river system.

The generalized natural community map for a portion of the park (**Figures 2** & **3**) show how elevation, geology, and directional aspect affects the distribution, pattern, and relative relationship of natural communities.

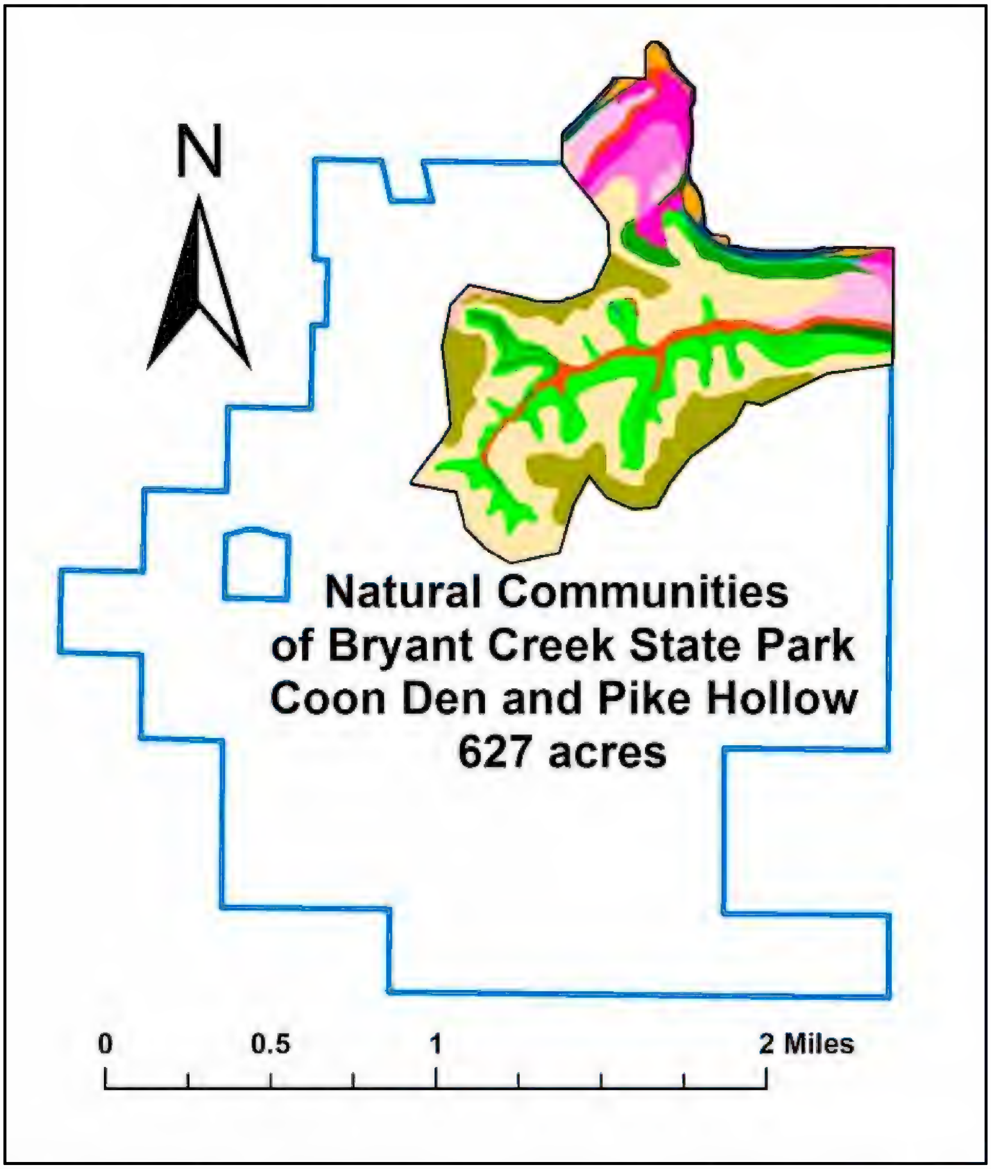

Figure 2. Location of the 627-acre region of the park map including Coon Den Bluff and Pike Hollow in which natural communities were mapped in detail, as shown in **Figure 3**.

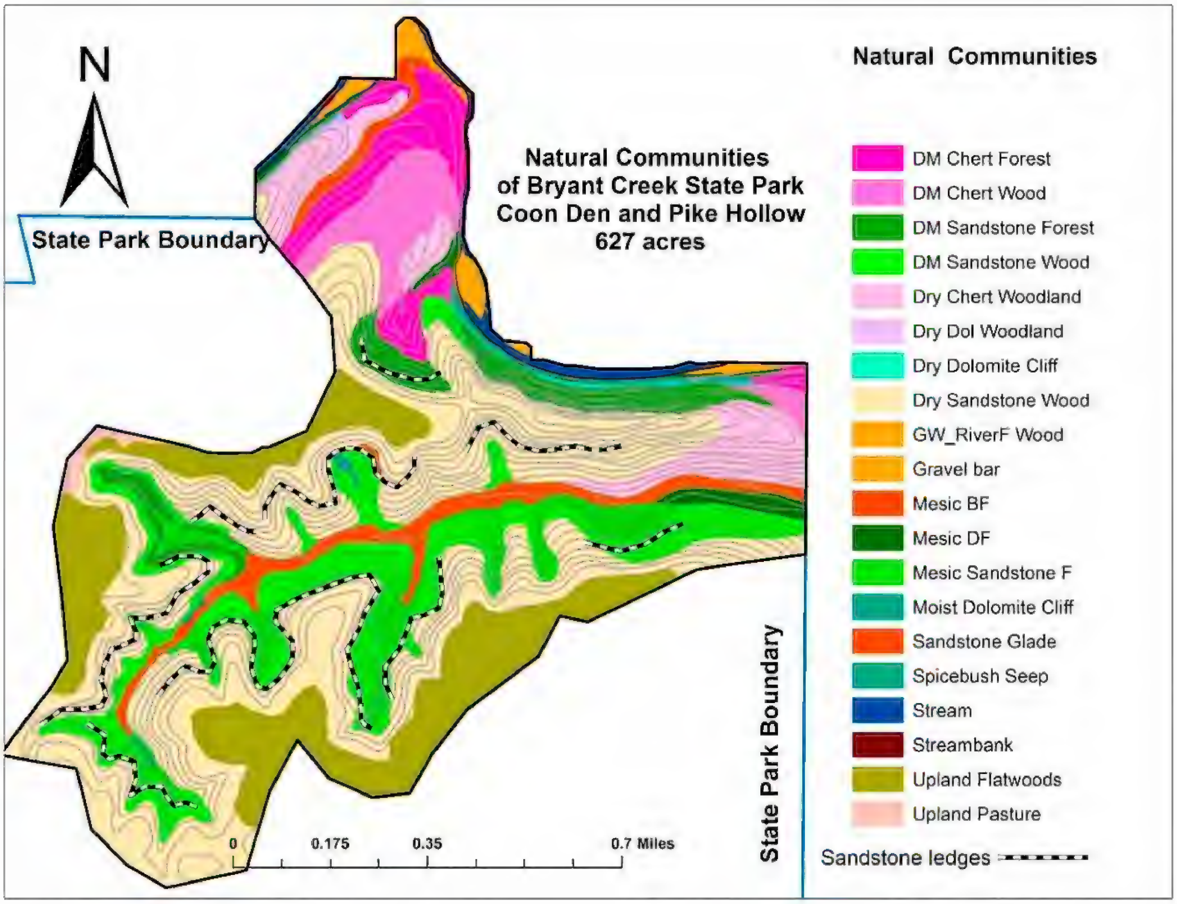

Figure 3. Twenty distinct natural communities were mapped in this 627-acre portion of Bryant Creek State Park. Contours reveal the relationship between dry, dry-mesic, and mesic woodlands and forests in the Pike Hollow Valley (lower portion of map), and for Coon Den Bluff to the northeast. Pink and purple hues capture chert and dolomite woodlands and forests. Similar natural communities would be expected in the adjacent deep valleys north of Highway N.

Flora of Upland Natural Communities

Dolomite Glade

Fourteen glades totaling 13 acres occur within the park. Thirteen glades are Jefferson City Dolomite (Quarry Ledge unit) while one small glade is Roubidoux sandstone. At 8 acres, the largest dolomite glade complex (consisting of 4 closely associated glade units) occurs on a high knob and continues onto a private inholding south along Highway N, totaling 18 acres in extent. Seven of the remaining 9 glades occur toward the east portion of the park where Highway N turns south toward County Road N-345. These glades line up along the north-south borders of a graben mapped by Larry “Boot” Pierce, Chief, Geological Resources Section of the Missouri Geological Survey, Missouri Department of Natural Resources. All glades, except two very small ones, coincided well with those mapped in the 2018 Missouri Natural Glades shapefile (https://www.msdis.missouri.edu).

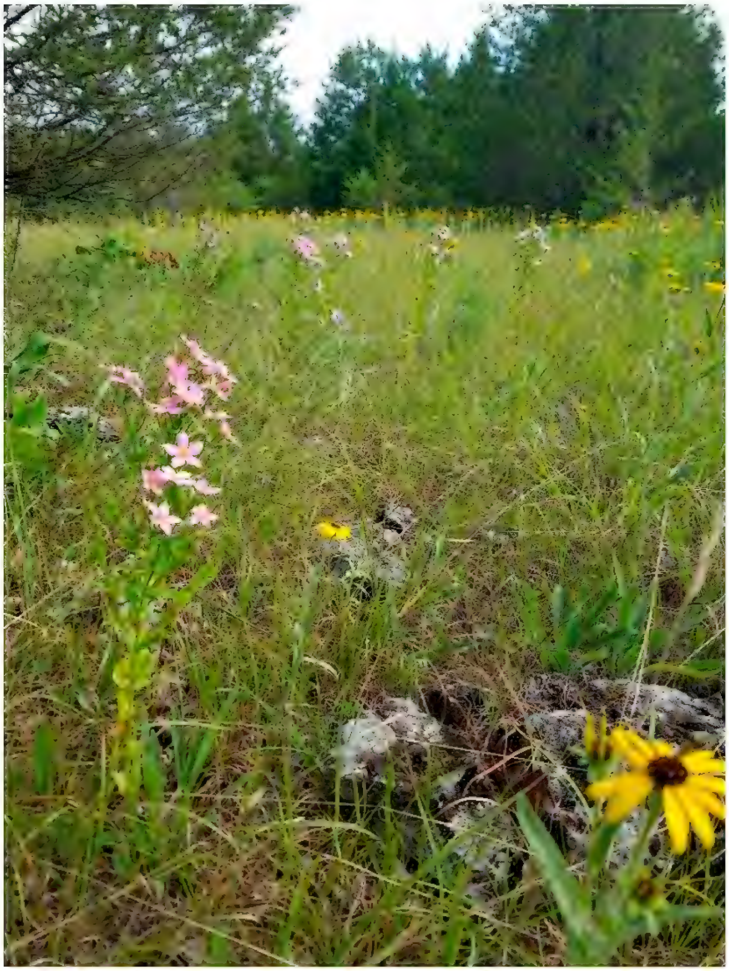

Figure 4. Dolomite glade on knob south of Highway N.

At least 175 of the park's 940 plant taxa occur on dolomite glades, comprising 19 percent of the park's total flora. However, at least 30 of these plants are rare, with several random occurrences due to their isolation and small numbers. Glade plants with only 1-5 individuals noted include prairie acacia (*Acaciella angustissima* — 1 plant), Trelease's larkspur (*Delphinium treleasei* — 1 plant), glade adders tongue (*Ophioglossum engelmannii*), Missouri evening primrose (*Oenothera macrocarpa*), pink satin grass (*Muhlenbergia capillaris*), rigid goldenrod (*Solidago rigida*), silky aster (*Symphyotrichum sericeum*), slender ladies tresses (*Spiranthes lacera*), crested coral root (*Hexalectris spicata*), prairie parsley (*Polytaenia nuttallii*), shaggy evolvulus (*Evolvulus nuttallianus*), quillwort (*Isoetes butleri* — 2 plants), and Nuttalls prairie iris (*Nemastylis nuttallii* — 1 previous season seed pod). Most of these species (and others) should have higher relative importance values in intact glades, meaning they should be more evenly distributed either throughout the glade, or at least in larger populations/numbers in suitable glade niches. Further searches should result in additions of other characteristic glade species including Gattinger's goldenrod (*Solidago gattingeri*), pale umbrellawort (*Mirabilis albida*), and prairie turnip (*Pediomelum esculentum*).

A grove of American smoke tree (*Cotinus obovatus*) was confined to ledges and outcrops of a dry dolomite woodland. The impervious nature of the dolomite glades also likely contributes to the perched water of a bordering Ozark fen.

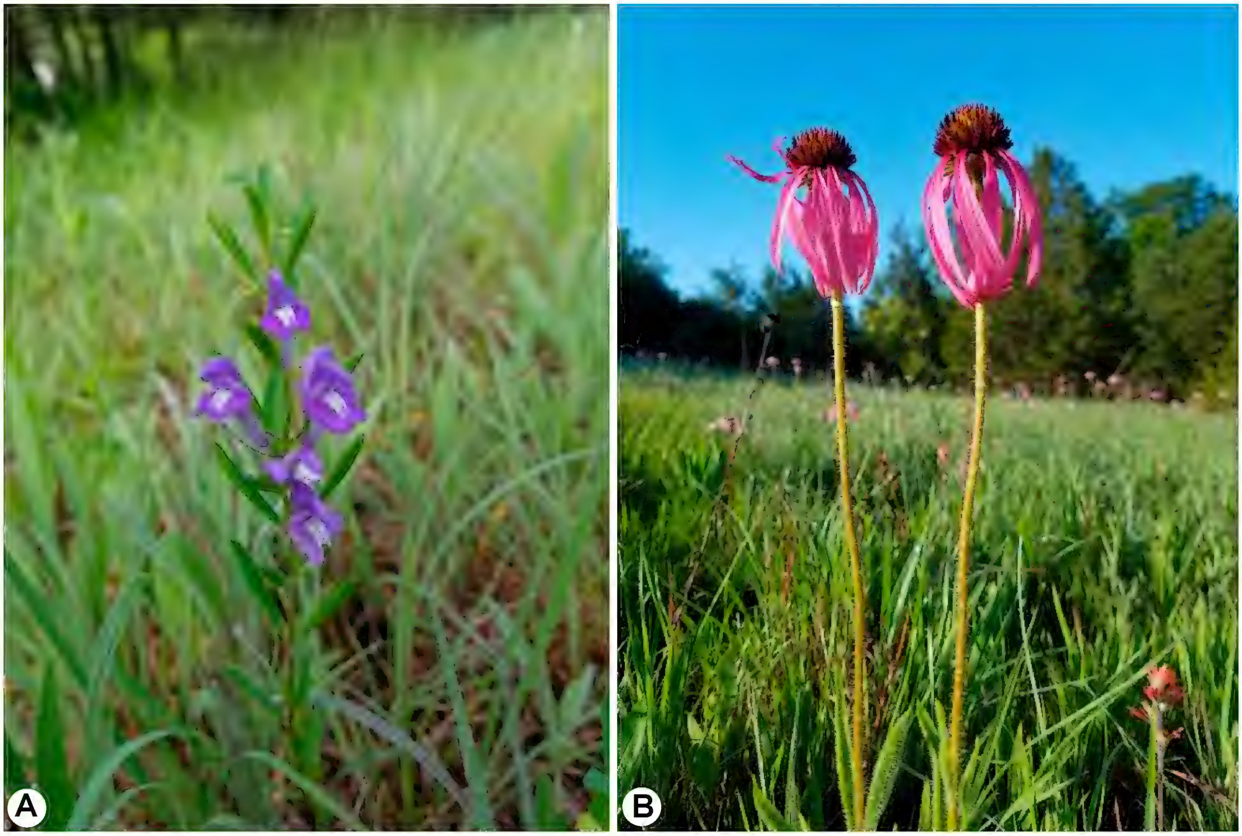

Figure 5. A: Bush's Skullcap (*Scutellaria bushii*) and **B:** Glade Purple Coneflower (*Echinacea simulata*) are endemic to dolomite glades.

Sandstone Glade

One small glade on Roubidoux sandstone (**Figure 7**) occurs with an acid seep along ledges below the glade. This glade is located 0.5 miles east of the residence along the upper slopes of a south-facing lateral valley of Pike Hollow. Plants restricted to the glade include beard grass (*Gymnopogon ambiguus*), nodding ladies tresses (*Spiranthes cernua*), woodland yellow flax (*Linum virginianum*), goats rue (*Tephrosia virginiana*), hairy mountain mint (*Pycnanthemum virginianum*), meadow sedge (*Carex granularis*), slender spike rush (*Eleocharis verrucosa*), and rough rush grass (*Sporobolus vaginiflorus*).

Other very small, dry, barren sandstone ledges with glade affinities occur sporadically along sandstone ledge tops, particularly along south and west-facing high slopes. Intermittent streams in high headwater valleys often scour open exposures of sandstone slab rock, resulting in glade-like qualities.

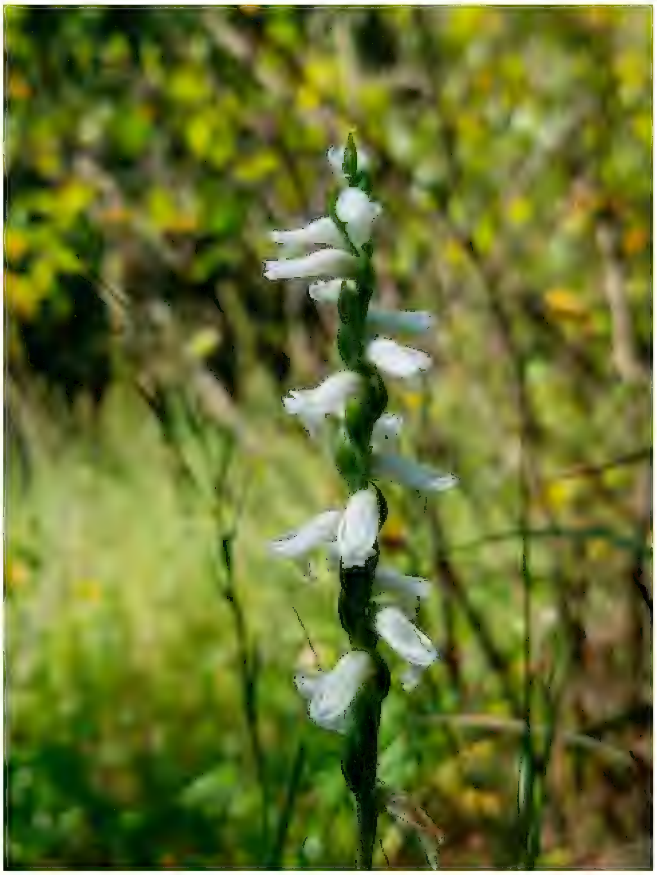

Figure 6. Dune ladies' tresses (*Spiranthes cernua*) is found only on one sandstone glade in the park.

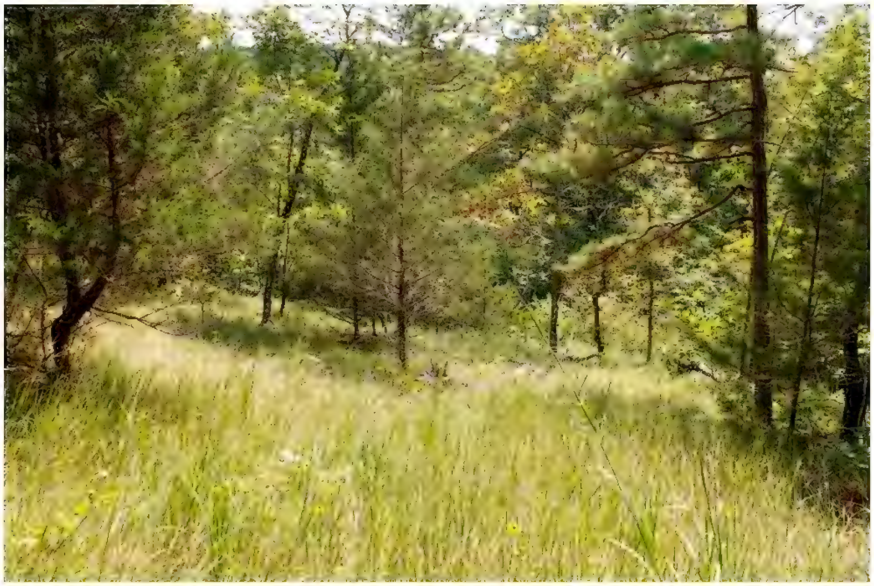

Figure 7. The park's only known relatively small sandstone glade has produced several species not found elsewhere in the park.

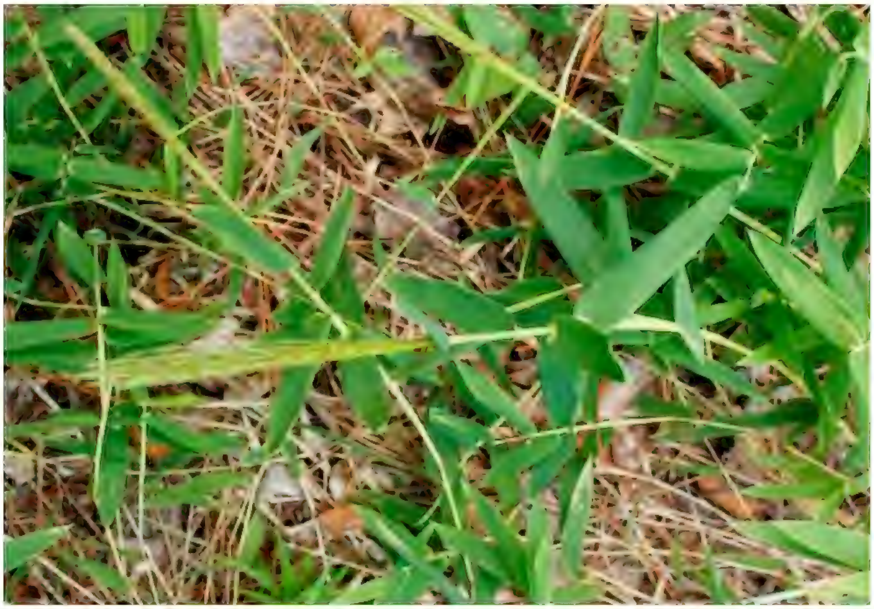

Figure 8. Beard grass (*Gymnopogon ambiguus*) is scattered across the sandstone glade shown in **Figure 7**.

Upland Flatwoods

Upland flatwoods are seasonally dry woodlands that occupy broad, nearly level ridges and flats. Collectively, around 12-14 areas averaging 8-15 acres each of mapped flatwoods soils total approximately 150 acres across the park, occurring primarily on Tonti and Sholten soils characterized by an impervious claypan that impedes water movement. The clayey parent materials are derived from loess, pedisediments, and weathered residuum. The nearly impermeable subsurface clay layer forces precipitation to slowly drain away from the nearly level flats (1-3% slope). This clay layer dries rapidly during the summer, leading to slow root development and stunted tree growth. Where nearly level, seasonal ponding occurs, resulting in temporary wetland conditions and the presence of numerous facultative wetland species. Ponded water eventually evaporates as very little of the precipitation perched over the clay layer infiltrates through it.

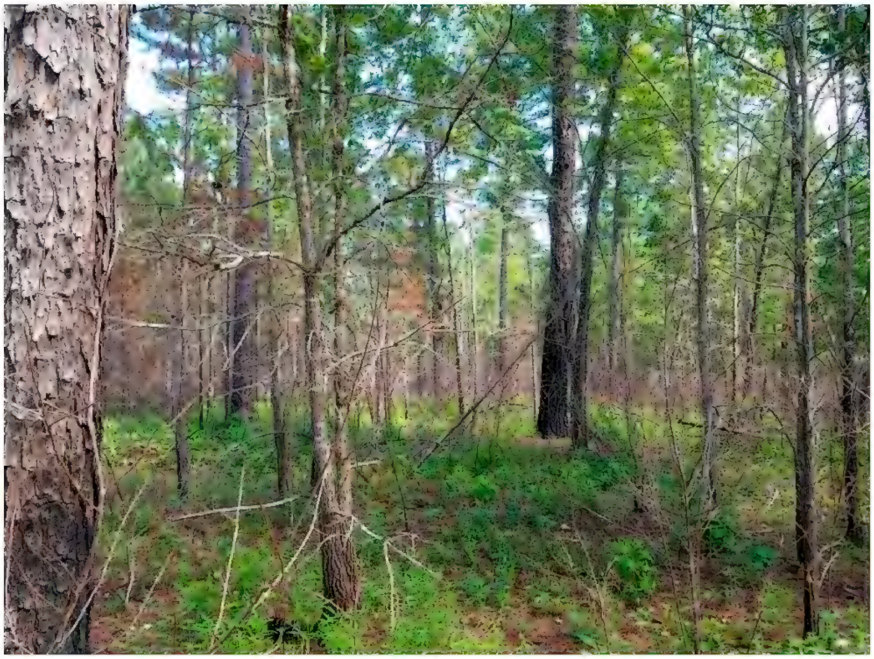

Figure 9. Shortleaf pine and post oak dominate the fragipan soils of this recently burned upland flatwoods south of Highway N.

Flatwoods at the park are dominated by shortleaf pine (*Pinus echinata*) along with post oak (*Quercus stellata*). Black oak (*Q. velutina*), young shagbark hickories (*Carya ovata*), and black gum (*Nyssa sylvatica*) are scattered throughout. Sassafras (*Sassafras albidum*) and persimmon (*Diospyros virginiana*) are common in the understory.

Species highlighted in **bold** below occur only in wet depressions or old road ruts in flatwoods. Locally common herbaceous plants in flatwoods include Sampson's snakeroot (*Orbexilum penduculatum*), oblong sunflower (*Helianthus hirsutus*), common cinquefoil (*Potentilla simplex*), yellow honeysuckle (*Lonicera flava*), coralberry (*Symphoricarpos orbiculatus*), knee grass (*Dichanthelium dichotomiflorum*), and early goldenrod (*Solidago juncea*). Common sedges are fuzzy wuzzy sedge (*Carex hirsutella*), reflexed sedge (*C. retroflexa*), blue sedge (*C. glaucodea*), and black-edged sedge (*C. nigromarginata*). Slender ladies' tresses orchid (*Spiranthes lacera*) is widely scattered in little bluestem-dominated shortleaf pine flatwoods. One occurrence of two-flowered rush (***Juncus biflorus***) exists in a wet depression of mixed tall fescue and common sumac).

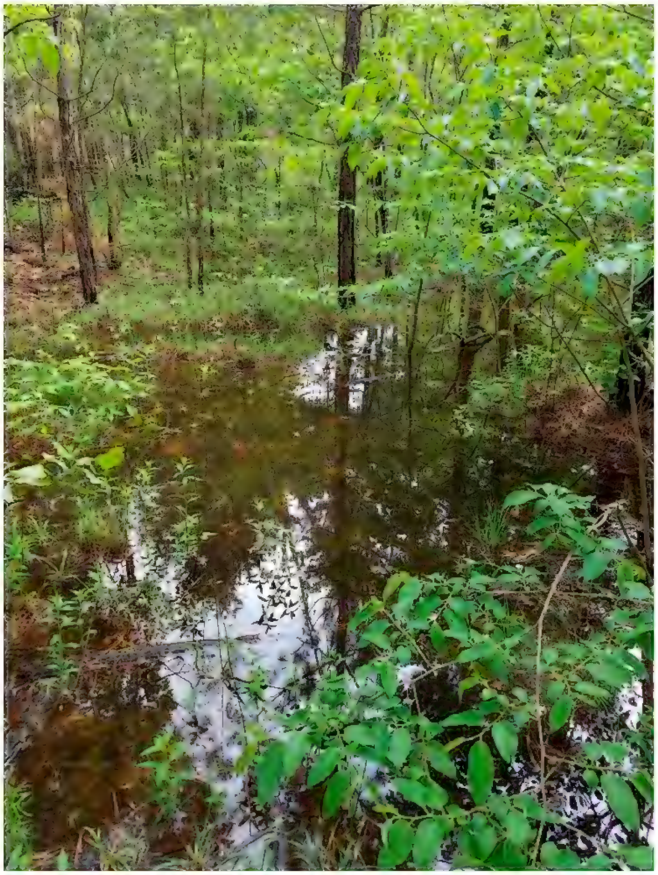

Figure 10. Seasonally wet depressions, especially in openings, form a dense mix of shrubs and herbs. Persimmon (*Diospyros virginiana*), late low blueberry (*Vaccinium pallidum*), poison ivy (*Toxicodendron radicans*), saw greenbriar (*Smilax bona-nox*), plains blackberry (*Rubus ablatus*), and summer grape (*Vitis aestivalis*) are common.

Plant species growing in temporary pools include willow aster (***Symphyotrichum praealtum***), red bulrush (*Scirpus pendulus*), Carolina leaf-flower (***Phyllanthus caroliniensis***), rattlebox (*Ludwigia alternifolia*), weak St. John's wort (*Hypericum mutilum*), false nettle (*Boehmeria cylindrica*), fox sedge (*Carex vulpinoidea*), and short-pointed cyperus (***Cyperus acuminatus***). Two species of conservation concern found in an open wet depression are cliff fern (***Woodsia obtusa*** subsp. ***occidentalis***) and hairy lettuce (*Lactuca hirsuta*).

Easily rutted, temporary water-filled depressions in old logging roads provide clues to the former, more widespread occurrence of wetland species occupying wet depressions of former higher quality open flatwoods. Many of the species noted in water-filled road ruts have moderate to high C-values and represent the only observed occurrences in the entire park. Plants found only in upland flatwoods road ruts are creeping coyote thistle (***Eryngium prostratum***), common rush (***Juncus effusus*** subsp. ***solutus***), path rush (***Juncus tenuis*** var. ***anthelatus***), squarrose sedge (***Carex squarrosa***), and southern sedge (***C. austrina***). Other uncommon flora includes large-flowered water plantain (*Alisma trivale*), blunt spike rush (*Eleocharis obtusa*), clammy hedge hyssop (*Gratiola neglecta*), false pimpernel (*Lindernia dubia* var. *anagallidea*), roundleaf mud plantain (*Heteranthera rotundifolia*), and marsh purslane (*Ludwigia palustris*). Gaping panic grass (***Steinchisma hians***) is an S3 species of conservation concern found in 4 sites exclusively in muddy road rut depressions in flatwoods.

Oddly, while created by vehicle disturbance, water-filled deep road ruts are the primary locations for several rare and conservative plant species cited above. Few of these species occur in other park wetland habitats, artificial or otherwise, suggesting that the seed propagules remain dormant in low flatwoods depressions for many years until some disturbance stimulates them to germinate.

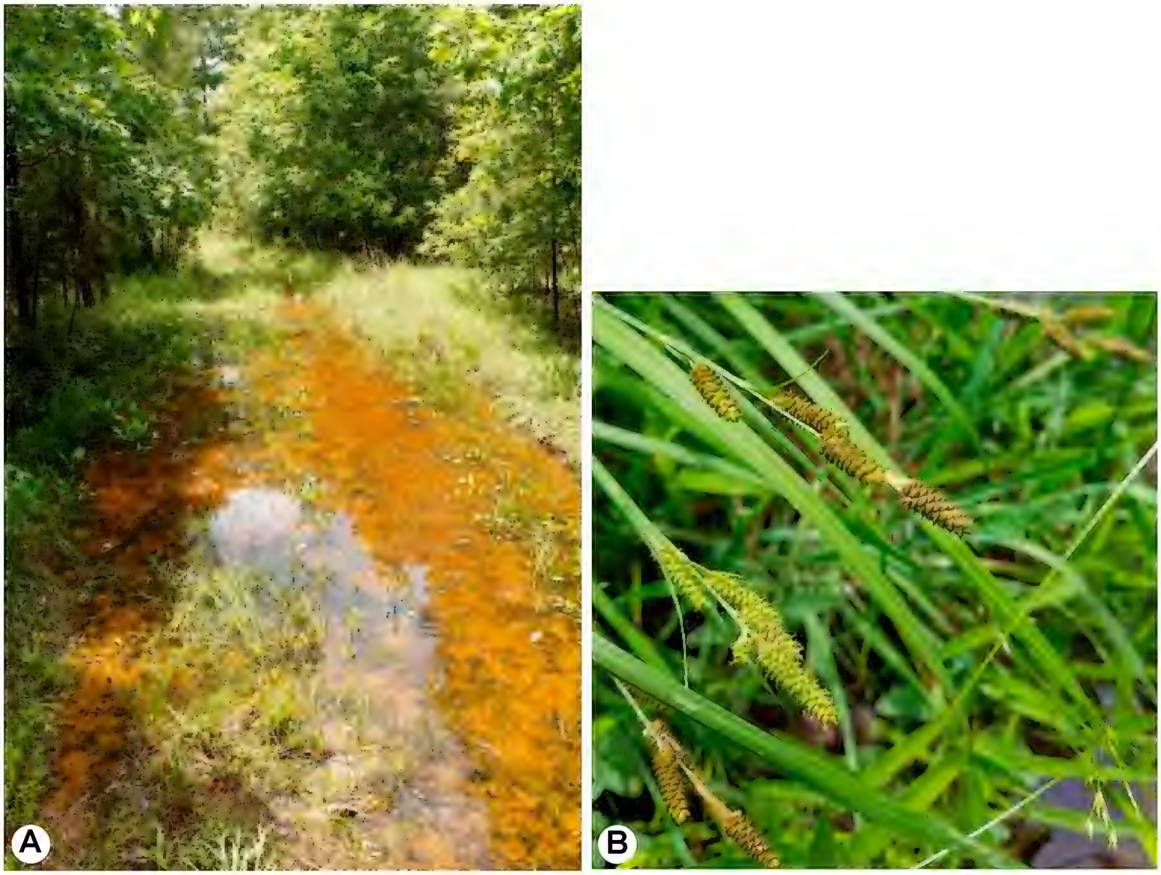

Figure 11. A: Clayey soils of upland flatwoods were easily rutted during logging operations from 2002 to 2008. Winter and spring precipitation fill the rutted depressions, providing favorable growing conditions for several obligate (and rare) wetland species, perhaps relicts of former natural upland wet depressions. **B:** squarrose sedge (*Carex squarrosa*) found only in one rut.

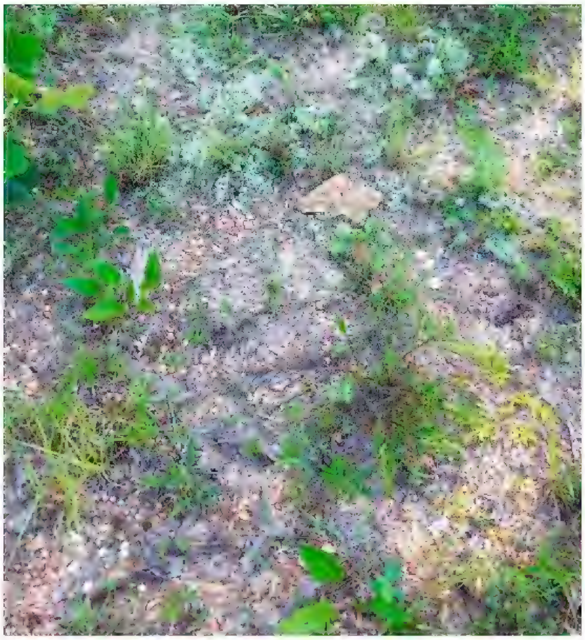

Figure 12. This sterile, clayey barren area of Tonti fragipan soil occurs beneath a powerline right-of-way in the extreme southeast portion of the park along Highway N. Plants found only here include nits and lice (*Hypericum drummondii*) and thread-leaf sundrops (*Oenothera linifolia*).

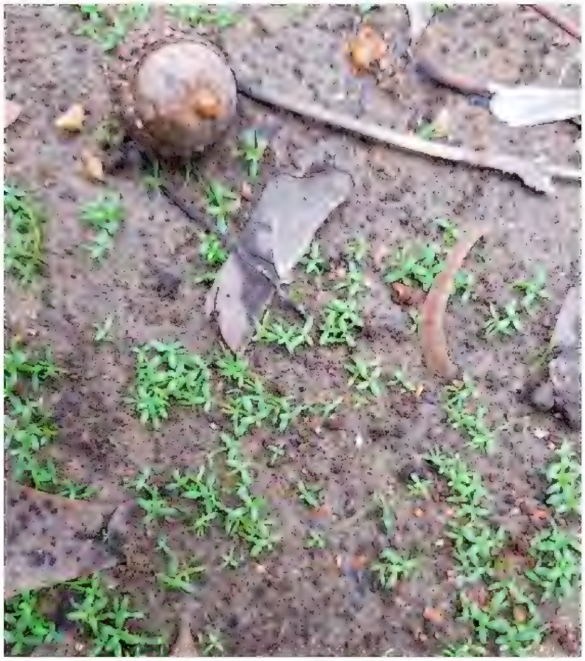

Figure 13. The minute terrestrial starwort (*Callitriche terrestris*) occurs in barren clay depressions of flatwoods.

Dry Chert Woodland

Insoluble chert residuum comes from three often overlapping sources in the park. First, weathering of cherty Jefferson City dolomite results in layers of insoluble surface residuum. Second, dolomite is abundant in the Roubidoux formation along with several thick layers of sandstone. However, most of the chert-laden dolomite in this formation has weathered away, leaving areas of scattered chert residuum, along with exposed layers of sandstone outcrops, ledges, small cliffs, and residual boulders of various sizes. Chert originating from either or a mix of both rock formation sources is most prevalent near and around the Jefferson City Formation, and occasionally in areas of the Roubidoux formation.

To a lesser extent, larger cryptozoan chert boulders and rock ledges occupy the top layer of the Gasconade Formation, especially at the east end of the north high ridge of Pike Hollow. Accumulated deposits of chert are most prevalent on steeper slopes and narrow ridges, often resulting in plant composition characteristic of chert-dominated natural communities, especially near the higher elevation portions of the park where dolomites are still prevalent. However, the Roubidoux formation predominates throughout most of the park where cherty sandy loams and clays, along with one to three layers of sandstone, form the basis of upland sandstone natural communities.

A mapping challenge (and delineation of observed plant species) is whether sandstone, chert, or dolomite are the predominant soil and/or physical feature influencing plant species distribution. Roubidoux sandstone residuum (sandstone boulders, fragments, sandy loam, and ledges/outcrops) often accumulates immediately over dolomite material derived from the Gasconade or Jefferson City formations. Many acid-loving species occur in both sandstone and chert-derived soils. Regardless, I have attempted to choose locations that clearly fall into one or the other natural community as characterized by those species most faithful to the purest of one rock type or the other.

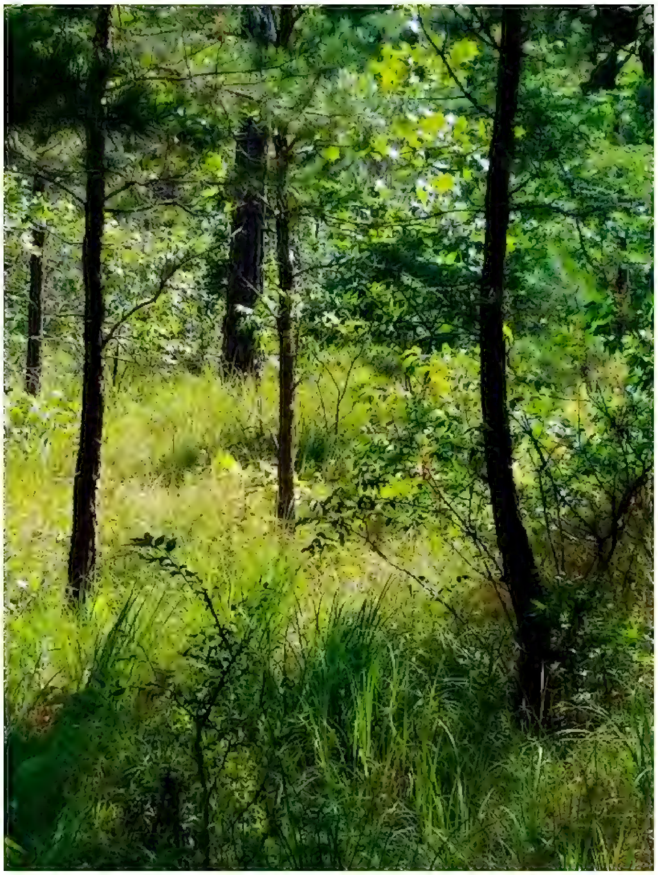

Figure 14. Extensive areas of shortleaf pine-dominated open grassy woodlands are scattered across high broad cherty ridges south of Highway N.

South of Highway N, extensive acreage of dry chert woodlands occupies Ocie-Gatewood and Bendavis-Poyner soils where chert residuum gravel and boulders are exposed along south- and west-facing slopes. Shortleaf pine (*Pinus echinata*), black oak (*Quercus vulutina*), white oak (*Q. alba*) and post oak (*Q. stellata*) are characteristic. Past logging, wildfires, and recent prescribed burns have provided open sunlit conditions favorable for the increase in characteristic herbaceous groundcover flora. The south-trending valley in the west portion of section 36 (out of the prescribed burn unit) exhibits good quality open woodland with a diverse ground cover. Expansive patches of warm season grasses mixed with characteristic woodland forbs occur on south-facing gentle to moderately steep slopes. The most abundant and widespread species (especially on the highest broad ridges in old log landings) include plains blackberry (*Rubus ablatus*), smooth sumac (*Rhus glabra*), winged sumac (*Rhus copallinum*), late low blueberry (*Vaccinium pallidum*), and poverty grass (*Danthonia spicata*). Over 75 herbaceous plant species have a C-value of 6 or higher. A few noteworthy species include dittany (*Cunila origanoides*), oblong sunflower (*Helianthus hirsutus*), bracken fern (*Pteridium aquilinum*), goat's rue (*Tephrosia virginiana*), upland boneset (*Eupatorium sessilifolium*), wild crocus (*Tradescantia longipes*), round leaved tick trefoil (*Desmodium rotundifolium*), eastern poison oak (*Toxicodendron pubescens*), lead plant (*Amorpha* *canescens*), velvety panic grass (*Dichanthelium scoparium*), and early branched panic grass (*D. praecocius*). Two species of conservation concern occur in dry chert woodland: hairy lettuce (*Lactuca hirsuta*) and crane fly orchid (*Tipularia discolor*).

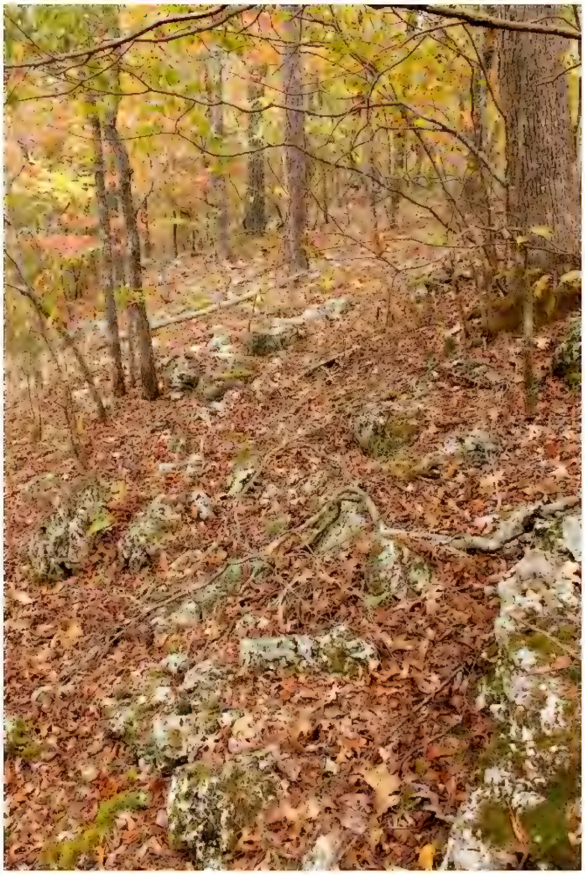

Figure 15. This dry chert woodland occurs along the top of Pearce Bluff. The chert originates from a cryptozoan reef chert layer at the top of the Gasconade Formation.

To the north, most dry chert woodland is confined to the steep slopes where the cryptozoan chert layer at the top of the Gasconade contacts the Roubidoux, especially along the south facing steep slopes of Pike Hollow along the east end, and mid slope of the valley and steep ridges west of Coon Den Bluff. Much of the narrow high ridge above Pearce Bluff occurs along the cryptozoan chert zone. Dominant trees include post oak (*Quercus stellata*), black oak (*Q. velutina*), blackjack oak (*Q. marilandica*), black hickory (*Carya texana*), red hickory (*C. ovalis*), and shortleaf pine (*Pinus echinata*). Understory trees, shrubs and vines include sassafras (*Sassafras albidum*), flowering dogwood (*Cornus florida*), Mexican plum (*Prunus mexicana*), shadbush (Amelanchier arborea), one-flowered hawthorn (*Crataegus uniflora*), late low blueberry (*Vaccinium pallidum*), deerberry (*V. stamineum*), saw greenbriar (*Smilax bona-nox*), and summer grape (*Vitis aestivalis*). Herbaceous species of increased importance on steep cherty slopes include little bluestem (*Schizachyrium scoparium*), tall nut rush (*Scleria triglomerata*), umbel-like sedge (*Carex* *umbellata*), black-edged sedge (*C. nigromarginata*), Bellows-beaked sedge (*C. albicans*), butterfly pea (*Clitoria mariana*), Arkansas bedstraw (*Galium arkansanum*), hairy bush clover (*Lespedeza hirta*), common St. Andrews cross (*Hypericum strangulum*), forked panic grass (*Dichanthelium dichotomum* var. *barbulatum*), Bicknell's panic grass (*D. bicknellii*), four-leaved milkweed (*Asclepias quadrifolia*), small-leaved tick trefoil (*Desmodium marilandicum*), white goldenrod (*Solidago hispida*), azure aster (*Symphyotrichum oolentangiensis*), starry rosinweed (*Siphium asteriscus*), and three-leaved violet (*Viola palmata*).

Species restricted to dry chert woodlands include firepink (*Silene virginica*), wild crocus (*Tradescantia longipes*), Elliott's brome sedge (*Andropogon gyrans*), clammy false foxglove (*Aureolaria pectinata*), upland boneset (*Eupatorium sessilifolium*), downy gentian (*Gentiana puberulenta*), and hop tree (*Ptelea trifoliata*). Future prescribed burning and thinning will increase the importance of warm season grasses, especially little bluestem, Indian grass, and panic grasses in these habitats, especially south of Highway N.

Extensive areas of thick oak and pine-dominated saplings, and sumac occur throughout the logged portion of the park. Prescribed burning, while beneficial, may not be enough to remove these thickets. Plains blackberry and sumac are present in high quantities, and if not kept in check will suppress the recovery of diverse woodland groundcover flora. Invasive species resulting from logging operations include sericea lespedeza (*Lespedeza cuneata*), spotted knapweed (*Centaurea stoebe* subsp. *micranthos*), sweet vernal grass (*Anthoxanthum odoratum*), and poison hemlock (*Conium maculatum*), particularly in disturbed soil from logging activity. Fortunately, the above invasives are currently confined to logging roads and log landings.

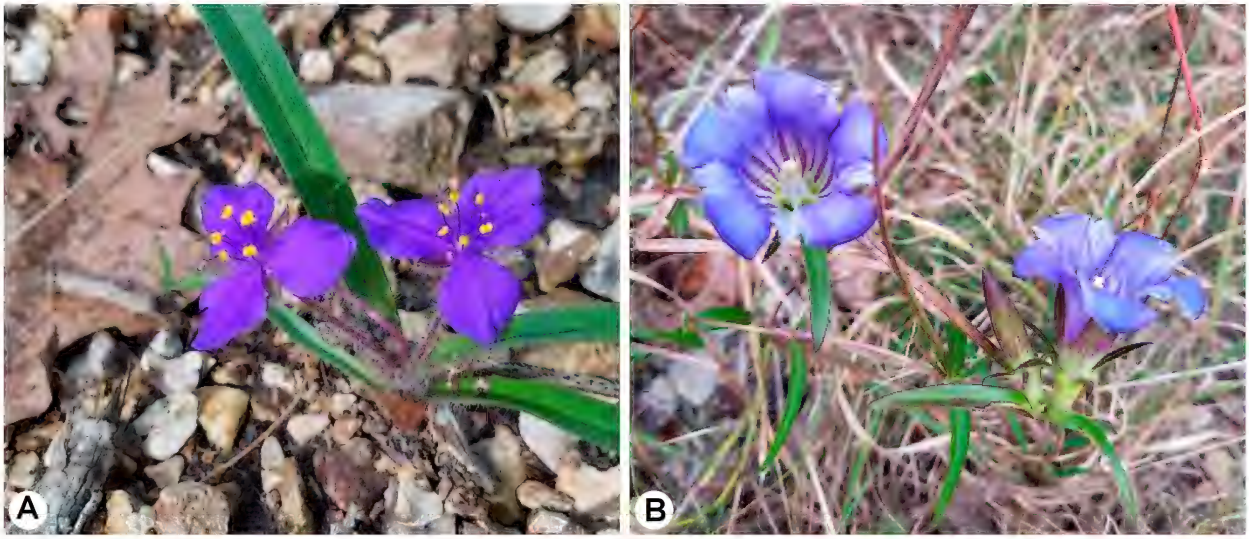

Figure 16. A: A small population of wild crocus (*Tradescantia longipes*) occurs only in dry chert woodland as does **B:** downy gentian (*Gentianella puberulenta*).

Dry-Mesic Chert Woodland

Available soil moisture increases both on mid and lower backslopes, and where moderately steep hills face north and east in deep valleys, especially those occurring west of Coon Den Bluff north of Simpson Pasture. Trees in this environment increase in size and height along with the development of mid story and understory trees and shrubs. Fire effects still mediate tree structure and plant composition, although to a lesser extent than in dry woodlands. Dominant white oak, northern red oak, and shortleaf pine intermix with bitternut hickory, black gum, and sassafras. Scattered areas of flowering dogwood, red maple, late lowbush blueberry, and Carolina buckthorn often form a continuous understory. Scarlet oak occurs in a few isolated locations with white oak and shortleaf pine.

Groundcover herbaceous species include elm leaved goldenrod (*Solidago ulmifolia*), bare-stemmed tick trefoil (*Hylodesmum nudiflorum*), pointed tick trefoil (*H. glutinosum*), hog peanut (*Amphicarpaea breacteata*), woodland brome (*bromus pubescens*), Bosc's panic grass (*Dichanthelium boscii*), hirsute sunflower (*Helianthus hirsutus*), Whorled milkweed (*Asclepias quadrifolia*), firepink (*Silene virginica*), hispid buttercup (*Ranunculus hispidus*), rue anemone (*Thalictrum thalictroides*), wild petunia (*Ruellia pedunculata*), rock satin grass (*Muhlenbergia sobolifera*), spreading aster (*Symphyotrichum patens*), wood angelica (*Angelica venenosa*), long awned wood grass (*Brachyelytrum erectum*). Christmas fern (*Polystichum acrostichoides*) appears especially along lower slopes.

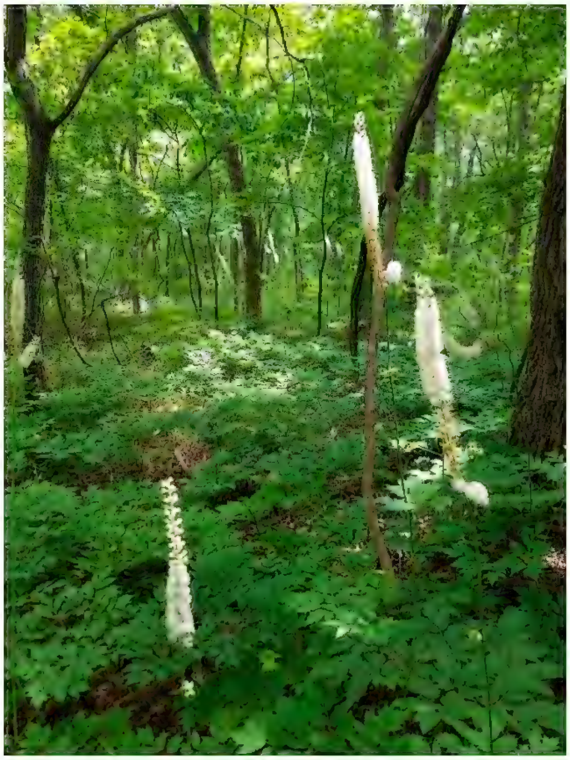

Figure 17. Black cohosh (*Actaea racemosa*) is scattered throughout dry-mesic chert woodlands just above the cane-dominated riverfront forests along Bryant Creek.

Dry Sandstone Woodland

Dry sandstone woodlands at Bryant Creek occur in a wide variety of natural community variations and subtypes ranging from broad upland gently sloping hills (south of Highway N) to very steep boulder and ledge strewn side slopes of the deep valleys north of Highway N along with Shiloh Valley. Dry sandstone woodland is the most widely distributed of the park's 32 natural community types.

South of Highway N, past logging has unveiled savanna-like groves of picturesque shortleaf pine prominent on the sandy, loamy Coulstone-Bender and Topazmill soils derived from sandstone, forming dry sandstone woodlands. Shortleaf pine, post oak, white oak, black oak, and black hickory are prominent along with inclusions of open, gnarly groupings of farkleberry (*Vaccineum arboreum*) and scattered shadbush (*Amelanchier arborea*). Widely distributed species include sassafras (*Sassafras albidum*), late lowbush blueberry (*Vaccineum pallidum*), and black-edged sedge (*Carex nigromarginata*). A variety of panic grasses (15 species), asters (6 species), goldenrods (7 species), carices (9 species), and scattered little bluestem are prominent along with many typical dry woodland forbs (**Figure 18**).

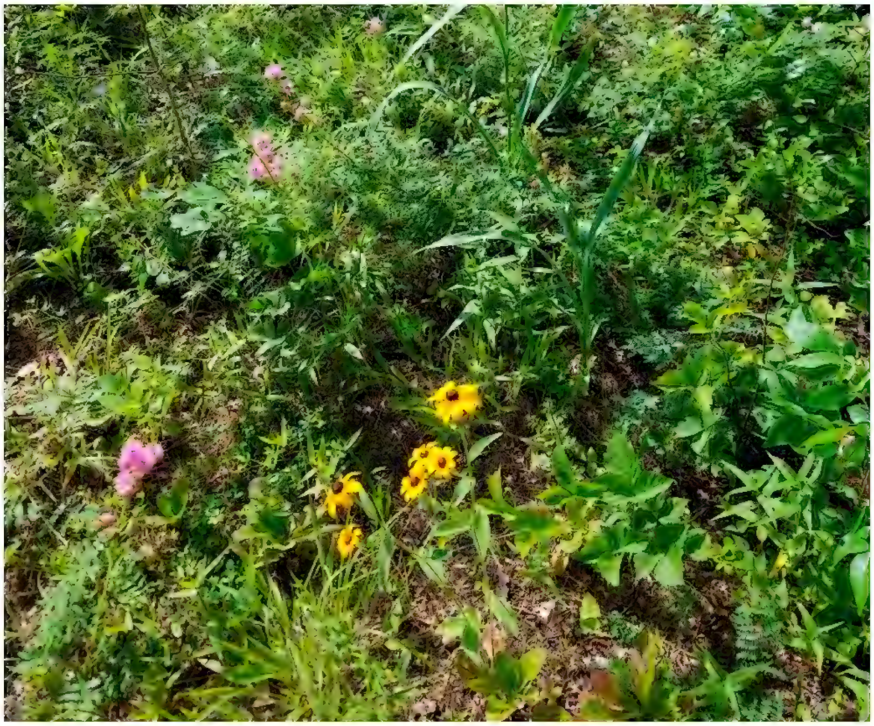

Figure 18. This upland open canopy dry sandstone woodland occurs on Topazmill soils where logging and a prescribed burn have restored a moderate diversity of fire-mediated forbs. Species occurring in this image include several panic grasses (*Dichanthelium* spp.), rattlesnake master (*Eryngium yuccifolium*), cream wild indigo (*Baptisia bracteata*), sensitive briar (*Mimosa quadrivalis nuttallii*), bracken fern (*Pteridium aquilinum*), hispid sunflower (*Helianthus hirsutus*), early goldenrod (*Solidago juncea*), dittany (*Cunilla origanoides*), goats rue (*Tephrosia virginiana*), Bradbury bee balm (*Monarda bradburiana*), one flowered dewberry (*Rubus enslenii*), black-eyed susan (*Rudbeckia hirta*), and lyre-leaved sage (*Salvia lyrata*).

North of Highway N, dry sandstone woodlands prevail along south- and west-facing steep hillslopes above the deeper, narrow valleys. Farkleberry (*Vaccineum arboreum*) forms small gnarly thickets on the steepest, driest upper slopes especially above the upper sandstone ledges and outcrops of south- and west-facing hills. Yellow honeysuckle (*Lonicera flava*) is widespread in spring but disappears in late summer as deer favor browsing this species. Grasses include poverty grass (*Danthonia spicata*), white haired panic grass (*Dichanthelium villosissimum*), silver plumegrass (*Erianthus alopecuroides*), little bluestem (*Schizachyrium scoparium*), and beard grass (*Gymnopogon ambiguus*). Some of the many characteristic groundcover herbs include butterfly pea (*Clitoria mariana*), goat's rue (*Tephrosia virginiana*), Nuttall's tick trefoil (*Desmodium nuttallii*), toadflax (*Comandra umbellata*), dittany (*Cunila origanoides*), reflexed sedge (*Carex retroflexa*), rattlebox (*Crotalaria sagittalis*), hairy hawkweed (*Hieracium gronovii*), hairy pinweed (*Lechea mucronata*), hog peanut (*Amphicarpaea bracteata*), and hairy bush clover (*Lespedeza hirta*).

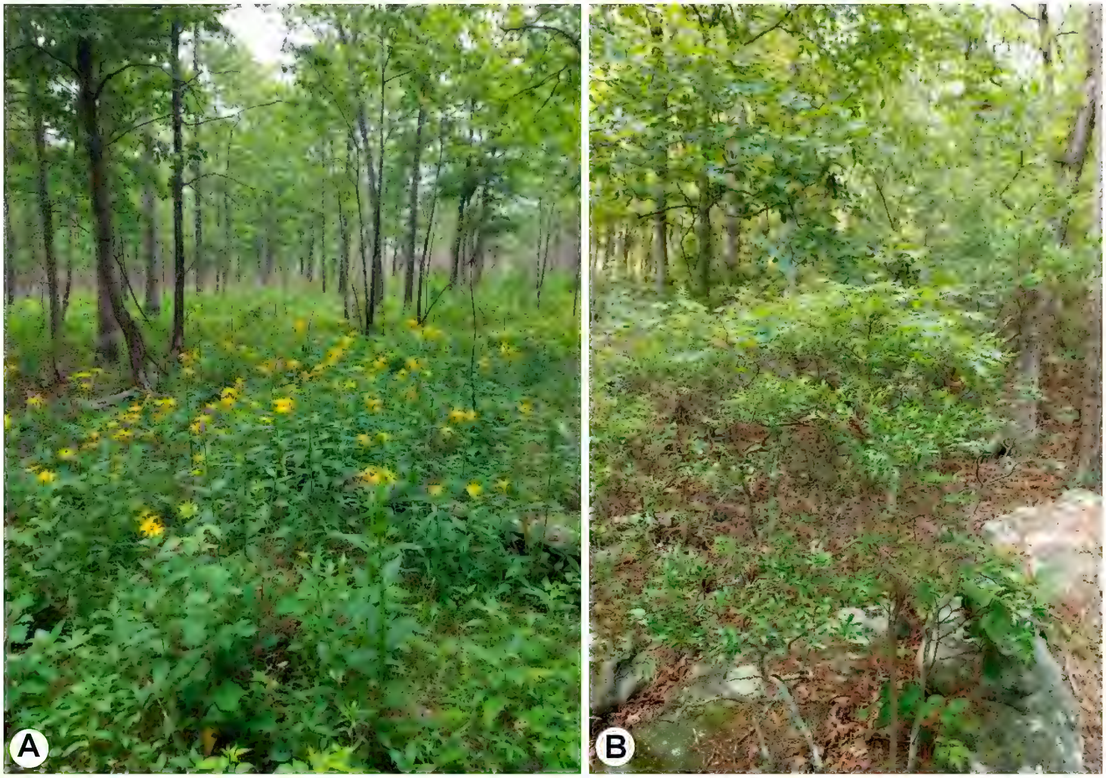

Figure 19. A: Yellow crownbeard (*Verbesina helianthoides*) flowers in abundance following a prescribed burn in this dry sandstone woodland on gently sloping hills south of Highway N. **B:** In contrast, scattered groves of farkleberry (*Vaccinium arboreum*) are common on steep southwest-facing slopes of hills north of Highway N.

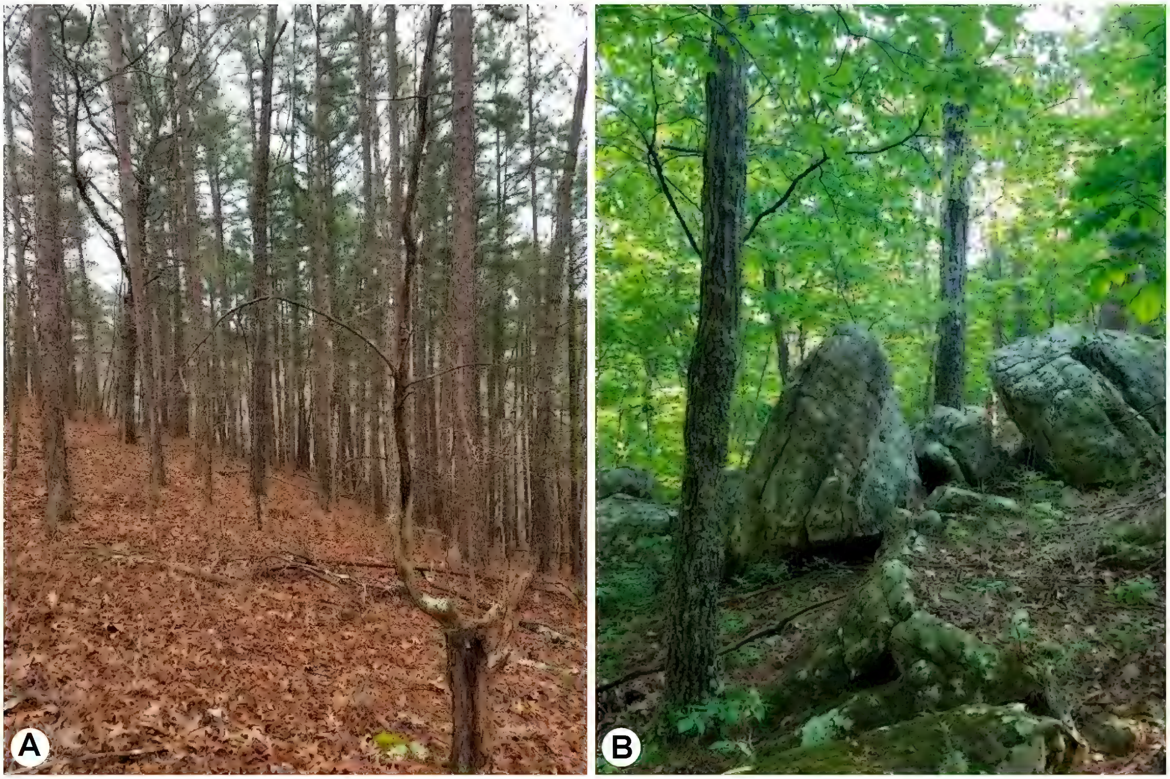

Figure 20. Many natural community variations (as depicted on pp. 194-197 of Nelson 2010) occur where the predominant sandstone of the Roubidoux Formation intersects the varied upland topography of the park. **A:** Shortleaf pine (*Pinus echinata*) forms dominant groves on upper south-facing slopes while **B:** oak hardwoods dominate areas of sandstone outcrops.

Dry Sandstone Cliff

This natural community is directly associated with dry sandstone woodland, both of which are derived from the Roubidoux Formation. Cliffs are 10 feet or higher vertical rock faces (Nelson 2010), often including rock shelters and overhangs. Hundreds of linear feet of sandstone ledges, outcrops, and boulders <10 feet high form parallel benches extending horizontally along elevation contours on mid and upper slopes of ridges and valleys throughout the park. Sandstone cliffs in the park are relatively small, ranging from 10-20 feet high. However, the difference between this height and the lesser, more abundant ledges of 3 to 10 feet do not seem to make any difference in the occurrence of plant species associated with cliff features. Vascular plants confined to dry sandstone cliffs and ledges include the hairy lip fern (*Cheilanthes lanosa*), prairie alum root (*Heuchera richardsonii*), six weeks fescue (*Vulpia octoflora*), Harvey's buttercup (*Ranunculus harveyi*), and marginal shield fern (*Dryopteris marginalis*). One species of potential conservation concern is found on dry sandstone cliff and/or ledges: the "status undetermined" lobed spleenwort (*Asplenium pinnatifidum*).

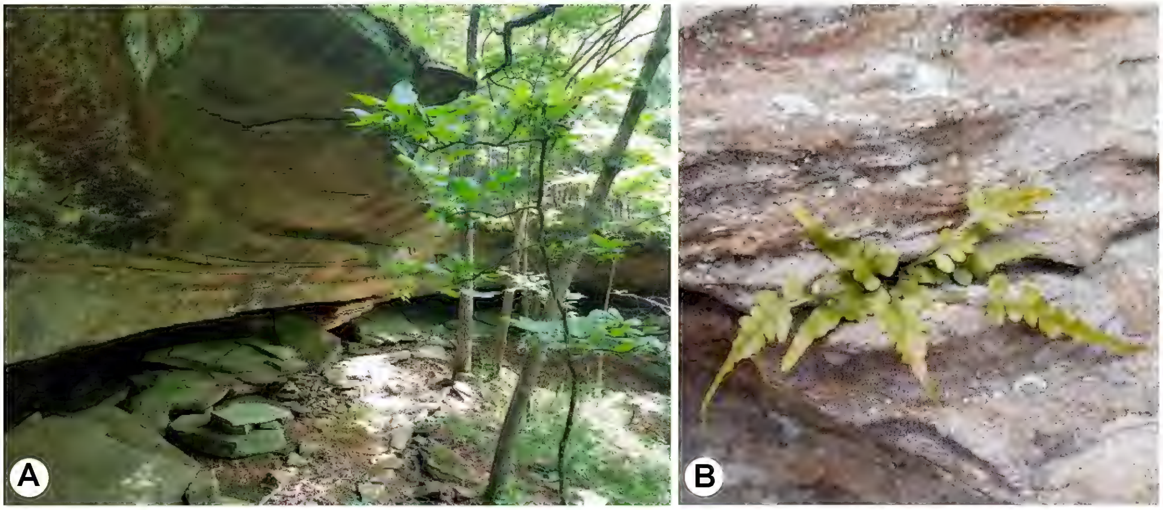

Figure 21. A: Collectively, numerous ledges interspersed with taller cliffs total several miles following mid-slope contours along steep hills and valleys, especially north of Highway N. **B:** Lobed spleenwort (*Asplenium pinnatifidum*) is a species of conservation concern restricted to crevices of dry sandstone cliffs and ledges.

Dry-Mesic Sandstone Woodland

As with dry-mesic chert woodland, deeper soils on north and east aspects of moderately steep to steep hillslopes increase both the density and height of the tree canopy, along with a somewhat developed understory of smaller canopy trees and shrubs. The line separating dry and dry-mesic sandstone woodland is often the sandstone ledge running the upper slope along the same contour. Below this high ledge, soils deepen. Shortleaf pine (*Pinus echinata*) and post oak (*Quercus stellata*) give way rapidly to white oak (*Q. alba*), northern red oak (*Q. rubra*), red maple (*Acer rubrum*), mockernut hickory (*Carya tomentosa*), and shagbark hickory (*C. ovata*). Flowering dogwood (*Cornus florida*), ironwood (*Ostrya* virginiana), and Carolina buckthorn (*Rhamnus caroliniana*) increase in the understory. Characteristic groundcover species include Christmas fern (*Polystichum acrostichoides*), pointed tick trefoil (*Hylodesmum glutinosum*), bare-stemmed tick trefoil (*H. nudiflorum*), hog peanut (*Amphicarpaea bracteata*), and several sedges including narrow-leaved wood sedge (*Carex digitalis*), few-fruited sedge (*C. oligocarpa*), and bellows-beaked sedge (*C. albicans*). Wood rush (*Trichophorum planifolium*) is confined to dry-mesic sandstone woodland. Common grasses include long-awned wood grass (*Brachyelylytrum erectum*), Bosc's Panic Grass (*Dichanthelium boscii*), and rock satin grass (*Muhlenbergia sobolifera*).

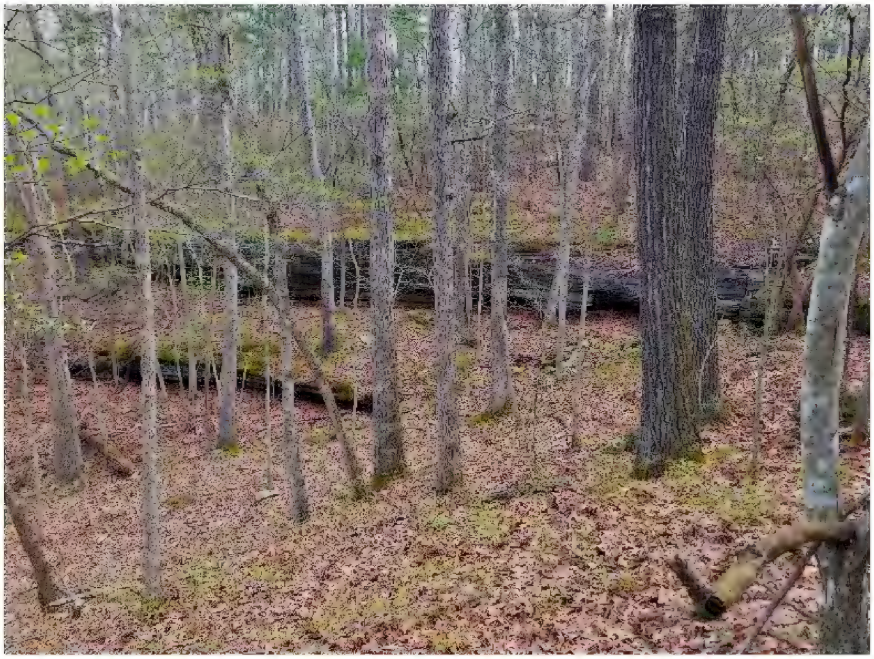

Figure 22. White oak and northern red oak dominate the dry-mesic sandstone woodland below this sandstone ledge, which is situated high above a north-facing cove.

Dry Dolomite Woodland

Larry "Boot" Pierce has provided a detailed geology map compiled from numerous field trips during summer 2020. The map focuses specifically on the delineation of Jefferson City and Gasconade formations, both of which define dolomite-based natural communities. Dolomitic outcrops at or near the land surface, coupled with calciphile plant species faithful to dolomite, help to delineate dolomite natural communities. Dry dolomite woodlands occur in small pockets around the dolomite glade-bald near the private inholding south of Highway N. A second dry dolomite woodland complex occurs along the north boundary of the graben mapped immediately north of Highway N. These woodlands occur in and around a series of small dolomite glades along the north graben boundary. Dry dolomite woodlands also occur halfway down the steep narrow ridge located immediately above Pearce Bluff.

The most extensive, well developed dry dolomite woodlands are confined to the small dolomite glade immediately north and west of the logging road access to the sinkhole pond. Dolomite bedrock is exposed along 6-8-foot ledges forming small ephemeral waterfalls. Dolomite bedrock ledges and rock pavement occur immediately above these ledges. Four tree-shrub species clearly define the boundaries of this dry dolomite woodland: red cedar (*Juniperus virginiana*), chinquapin oak (*Quercus muehlenbergii*), Schneck oak (*Quercus schumardii* var. *acerifolia*), and smoke tree (*Cotinus obovatus*). Other characteristic species include redbud (*Cercis canadensis*), white ash (*Fraxinus americana*), supplejack (*Berchemia scandens*), Carolina rose (*Rosa carolina*), elm-leaved goldenrod (*Solidago ulmifolia*), Ozark false boneset (*Brickellia eupatorioides*), sweet scented bedstraw (*Galium triflorum*), yellow pimpernel (*Taenidia integerrima*), orange puccoon

(*Lithospermum canescens*), and climbing milkweed (*Matelea decipiens*). Melica (*Melica nitens*) and purple cliffbrake (*Pellaea atropurpurea*) often grow on dolomite ledges and boulders. Heart-leaved skullcap (*Scutellaria ovata*), round-leaved ragwort (*Packera obovata*), and elm-leaved goldenrod (*Solidago ulmifolia*) are scattered beneath the dense grove of tall red cedars along the steep ridge mid-way downslope from Pearce Bluff.

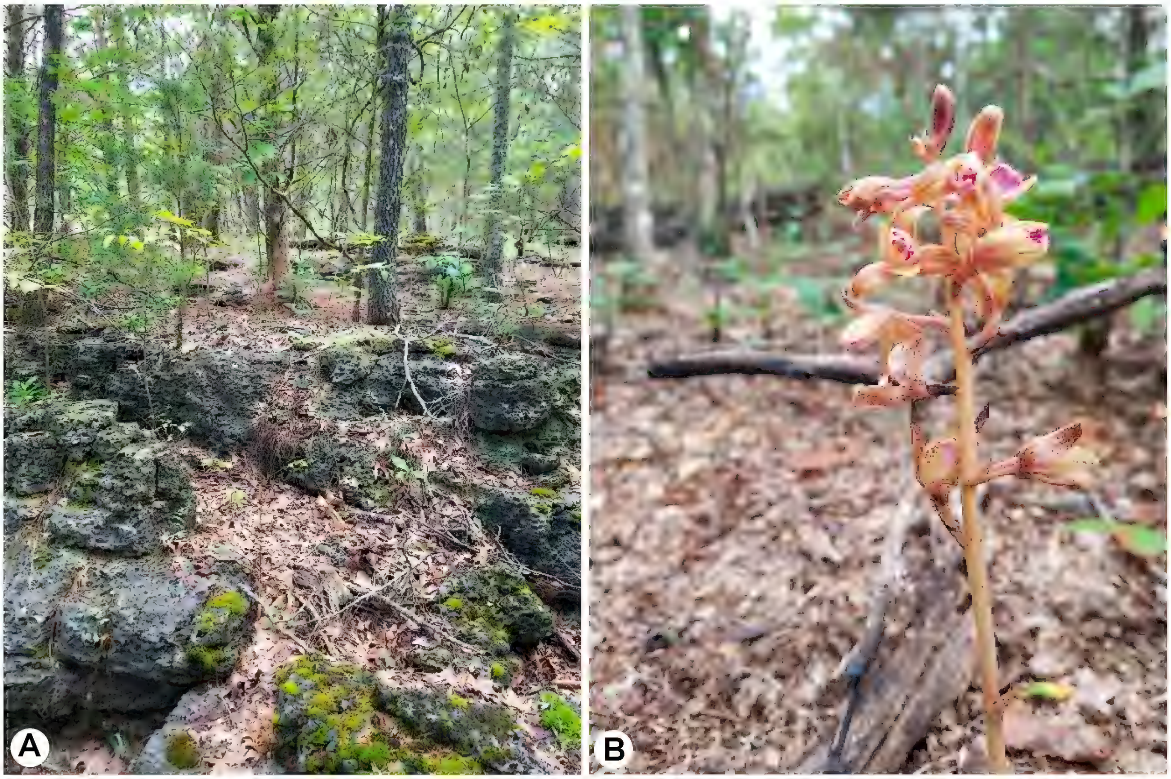

Figure 23. A: Dry dolomite woodland occurs in patches around dolomite glades. **B:** Coral root orchid (*Hexalectris spicata*) was discovered beneath cedars in this location only.

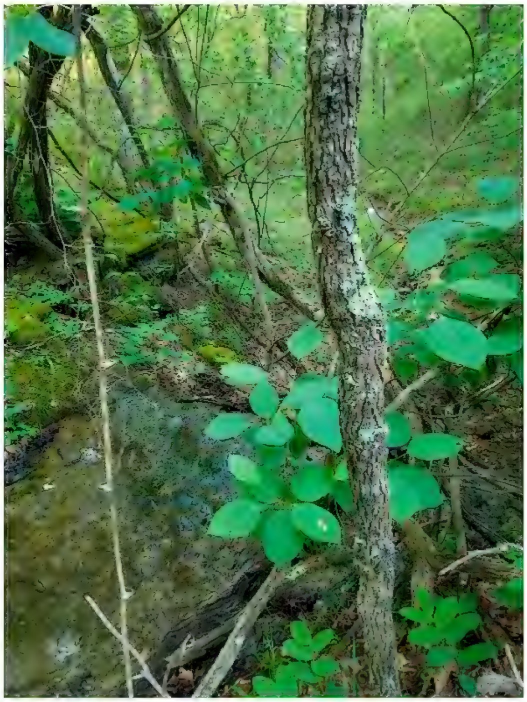

Figure 24. Several hundred small trees and shrubs of American smoke tree (*Cotinus obovatus*) occur in only one location in dry dolomite woodlands in the park.

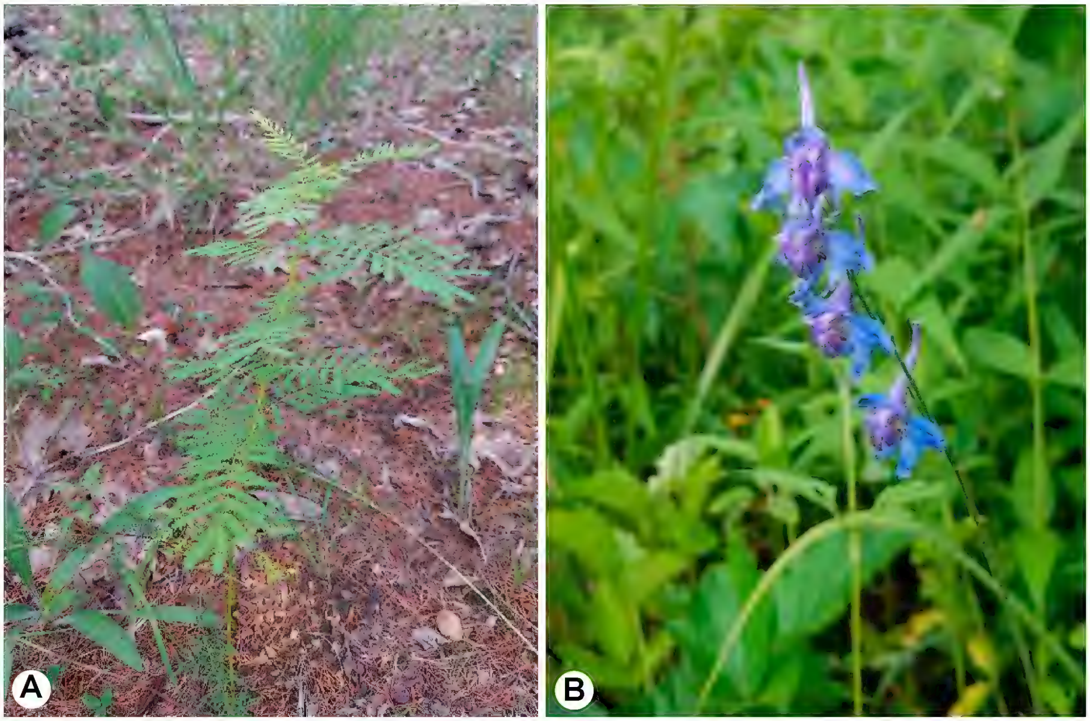

Figure 25. In the dry dolomite woodlands scattered around the dolomite glade bald, I located two rare species: **A:** prairie acacia (*Acaciella angustissima*) and **B:** Treleasei's larkspur (*Delphinium treleasei*).

Dry Dolomite Cliff

Nearly all of the ca. 4,600 linear feet of two separate cliffs in the park face northward along Bryant Creek. The dolomite cliff along Bryant Creek at Coon Den Bluff is approximately 3,400 feet long and 110 feet at its highest point, while to the west, Pearce Bluff is 1,200 feet long and 80 feet high. Combined, both are calculated using ArcMap to contain 5.4 surface acres of sheer vertical cliff pavement. Only scattered dolomite ledges barely 8 feet high occur elsewhere in the park, primarily where the lowest portions of the drainages in Pike, Dry, and Major hollows cut into the underlying Gasconade Formation.

Although facing northward, the cliffs at Coon Den and Pearce bluffs are a mix of both dry and moist dolomite cliff. The 100-foot-high cliffs reach far above the mesic dolomite forests below, exposing them to sunlight, wind, and excessive drainage.

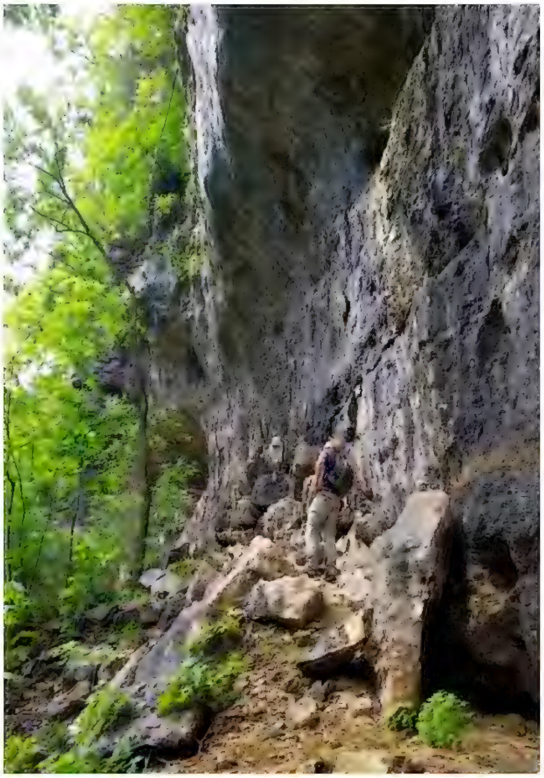

Figure 26. Natural Resource Steward Chris Crabtree gazes upward at the dramatic 110-foot-high dolomite cliffs of Coon Den Bluff.

Pearce Bluff is capped with a small zone of dry chert and dolomite woodland. Unlike Coon Den Bluff to the east, the chert residuum on the narrow ridge band is too shallow to allow for groundwater seepage to occur along the cliff ledge, leaving it excessively dry. Numerous ancient gnarly red cedar trees (*Juniperus virginiana*), many likely exceeding 600 years old, hang along the top edge of the sheer cliff accompanied by chinquapin oak (*Quercus muehlenbergii*). Drummond's goldenrod (*Solidago drummondii*) is nearly endemic to dolomite cliffs. Other characteristic plants include slender lip fern (*Cheilanthes feei*), smooth cliff brake (*Pellaea glabella*), purple cliff brake (*P. atropurpurea*), narrow-leaved bluet (*Hedyotis nigricans*), columbine (*Aquilegia canadensis*), bristle-leaved sedge (*Carex eburnea*), aromatic aster (*Symphyotrichum oblongifolium*), and yellow false foxglove (*Aureolaria grandiflora*).

Along Coon Den Bluff, the higher and longer dry dolomite cliff face is interrupted by expanses of groundwater seepage where marly calcite deposits are prevalent. Unlike Pearce Bluff, Coon Den Bluff is capped by an expansive and steep dry-mesic to mesic sandstone forest extending upward to a dry ridge approximately 200 feet in relief. The shading effect of the mesic forest conditions increases the importance of mesic species along the high cliff top. Common trees shading the upper cliff edge include chinquapin oak (*Quercus muehlenbergii*), blue ash (*Fraxinus quadrangulata*), northern red oak (*Quercus rubra*), ironwood (*Ostrya virginiana*), ninebark (*Physocarpus opulifolius*), and elderberry (*Sambucus canadensis*). Characteristic vines are trumpet creeper (*Campsis radicans*) and Virginia creeper (*Parthenocissus quinquefolia*). Some dozen fringe trees (*Chionanthus virginicus*) hang from the top edge of the cliff, the only location in the park. Other common plants along the edge and cliff face include Drummond's goldenrod (*Solidago drummondii*), Buckley's goldenrod (*S. buckleyi*), arrow-leaved aster (*Symphyotrichum cordifolium*), and seneca snakeroot (*Polygala seneca*).

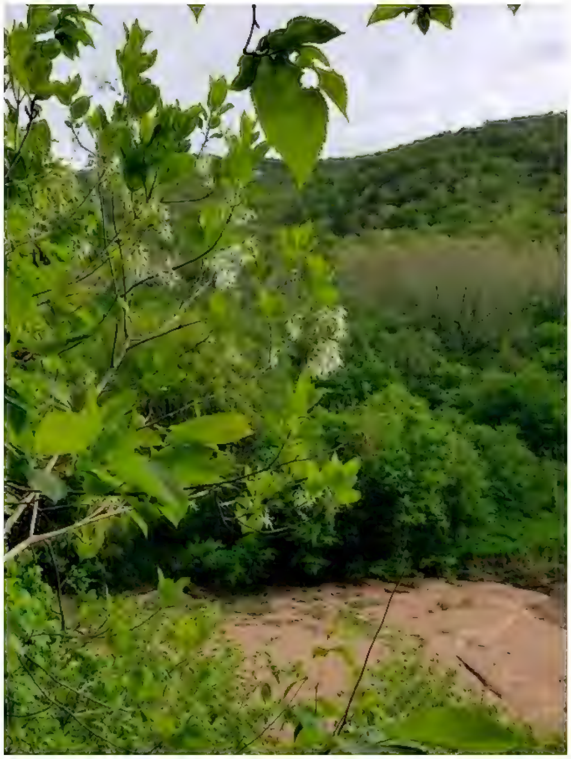

Figure 27. The draping white flowers of fringe tree (*Chionanthus virginicus*) hang pendulous precariously from the top edge of a 100-foot-high dolomite cliff. A sandbar sprawls below along the edge of Bryant Creek. Below, slender lip fern (*Cheilanthes feei*) occurs only along the driest exposures of dolomite just below the top edge of the highest cliffs.

Dry-Mesic Dolomite Woodland

This natural community is limited to north- and east-facing mid to lower slopes in valleys where dolomite bedrock is at or near the surface, especially on the Ocie-Gateweed soils associated with the graben feature immediately north of Highway N. Dry-mesic chert residuum forming dry-mesic chert woodland is intermingled with dolomite woodland where deep chert residuum occurs. The presence of dolomite bedrock at the surface aids in separating the two natural community types, along with increasing chinquapin oak (*Quercus muhlenbergii*), sugar maple (*Acer saccharum*), white ash (*Fraxinus americana*), white oak (*Q. alba*), northern red oak (*Q. rubra*), ironwood (*Ostrya virginiana*), spike grass (*Chasmanthium latifolium*), wingstem (*Verbesina alternifolia*), woodland brome (*Bromus pubescens*), soft agrimony (*Agrimonia pubescens*), green violet (*Hybanthus concolor*), and (**Figure 28**) round-leaved ragwort (*Packera obovata*).

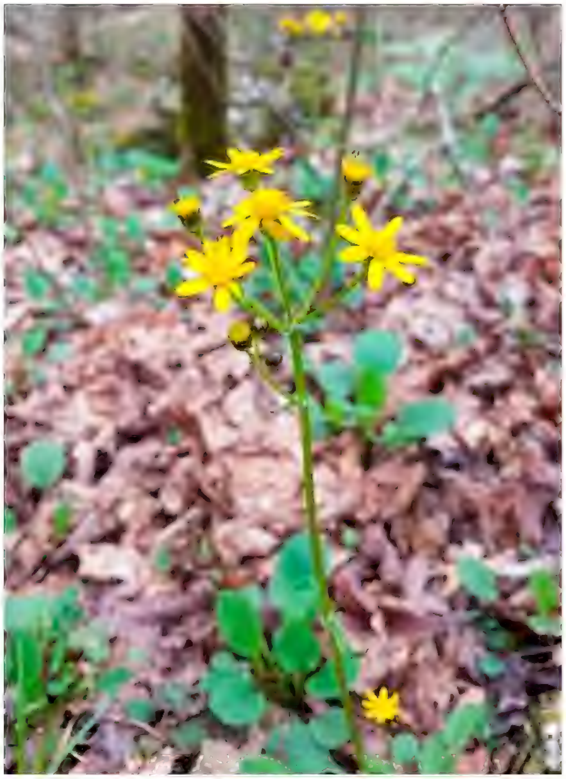

Figure 28. Round-leaved ragwort (*Packera obovata*) is abundant in dry-mesic dolomite woodlands.

Mesic Dolomite Forest

Mesic dolomite forest occupies two topographic positions in the park. The first occurs along relatively steep north-facing dolomitic slopes associated with the Gasconade Formation, primarily within the lower concave valleys and relatively steep lower slopes situated above the cliff edge of Coon Den Bluff, and several valleys immediately west of Pearce Bluff one mile upstream from Coon Den Bluff. The second forms the steep mixed colluvial soil, exposed dolomite ledges, and boulders intermixed with areas of dolomite talus in the zone bound by the cliffs of Coon Den Bluff and the streambank edge of Bryant Creek. This mesic dolomite forest/talus zone is 100-200 feet wide, stretching at least 0.5 miles along the base of Coon Den Bluff. When combined with the moist and dry dolomite cliff face features, associated sandstone boulders and ledges, and mesic and dry-mesic forest above the cliff edge, the entire length of Coon Den Bluff is worthy of consideration as a Missouri Natural Area. The assessment of flora strongly supports the area's distinction as a high-quality natural community as listed in the Missouri Natural Heritage Program database.

Northern red oak (*Quercus rubra*), white oak (*Q. alba*), sugar maple (*Acer saccharum*), American basswood (*Tilia americana*), slippery elm (*Ulmus rubra*), bitternut hickory (*Carya cordiformis*), white ash (*Fraxinus americana*), and walnut (*Juglans nigra*) are characteristic trees found in mesic dolomite forest on steep north- and east-facing cove valleys along Bryant Creek. Understory trees and shrubs include pawpaw (*Asimina triloba*), bladderpod (*Staphylea trifolia*), spicebush (*Lindera benzoin*), flowering dogwood (*Cornus florida*), and blue beech (*Carpinus carolinianus*). Many ferns, sedges, vines, grasses, and various wildflowers cover the organically rich mesic forest soil. Ferns include Christmas fern (*Polystichum acrostichoides*), broad-beech fern (*Phegopteris hexagonopteris*), maidenhair fern (*Adiantum pedatum*), and fragile fern (*Cystopteris protrusa*). Distinguished by its wine-colored basal stems, an expansive colony of Carey's sedge (*Carex careyana* — C-value 9) covers the lower steep slopes in the deep valleys along Bryant Creek. This is also where the rare (S2) Ozark spiderwort (*Tradescantia ozarkana*) occurs.

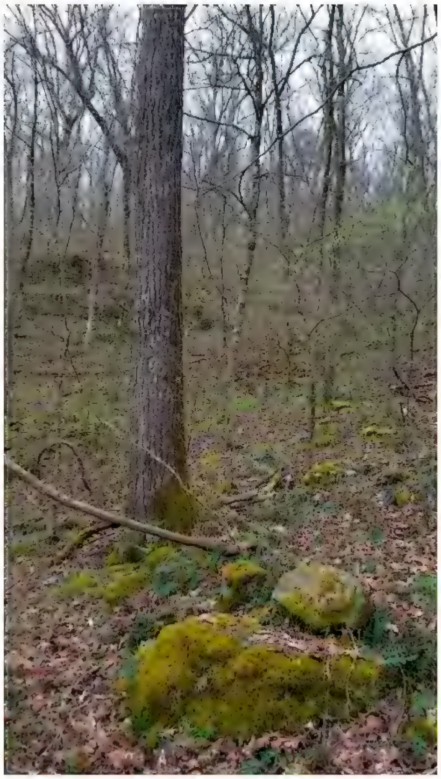

Figure 29. Bryant Creek's highest quality mesic dolomite forest occurs in a deep cove west of Pearce Bluff.

The park's highest density of spring ephemeral species carpets the mesic forest floor. A few of the many species include Harbinger of Spring (*Erigenia bulbosa*), false rue anemone (*Isopyrum biternatum*), wild geranium (*Geranium maculatum*), feathery false solomon's seal (*Maianthemum racemosum*), toad trillium (*Trillium sessile*), yellow bellwort (*Uvularia grandiflora*), wild ginger (*Asarum canadense*), pale corydalis (*Corydalis flavula*), bloodroot (*Sanguinaria canadensis*), goldenseal (*Hydrastis canadensis*), and hairy wood violet (*Viola sororia*). Early summer species include small yellow lady slipper (*Cypripedium calceolus* var. *parviflora*), blue cohosh (*Caulophyllum thalictroides*), black cohosh (*Actaea racemosa*), Canadian snakeroot (*Sanicula canadensis*), smooth sweet cicely (*Osmorhiza longistylis*), and ginseng (*Panax quinquefolius*). Late summer and fall flowering species include blue stemmed goldenrod (*Solidago caesia*), tall bellflower (*Campanula americana*), and blue lettuce (*Lactuca floridana*).

The mesic dolomite forest immediately below Coon Den Bluff and Pearce Bluff upstream occupies a mix of colluvial soil, decayed vegetation, decomposed talus, and massive boulders that calved from the 110-foot-high cliff. Vegetation here has a strong affinity to the previously described mesic dolomite forest of deep valleys situated in between the high cliffs or steep cove valleys along Bryant Creek. However, a much higher occurrence of dolomite ledges, scattered talus, and boulders occurs along this zone with an inclusion of plant species strongly associated with talus slopes.

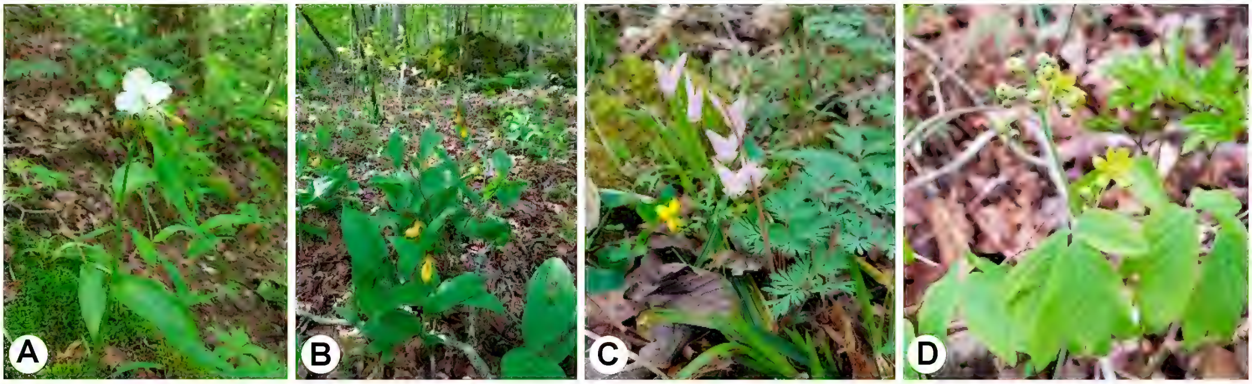

Figure 30. Plants of mesic dolomite forests include **A:** Ozark spiderwort (*Tradescantia ozarkana*); **B:** small-flowered yellow ladyslipper (*Cypripedium calceolus* var. *parviflorum*); **C:** Dutchman's breeches (*Dicentra cucullaria*); and **D:** blue cohosh (*Caulophyllum thalictroides*).

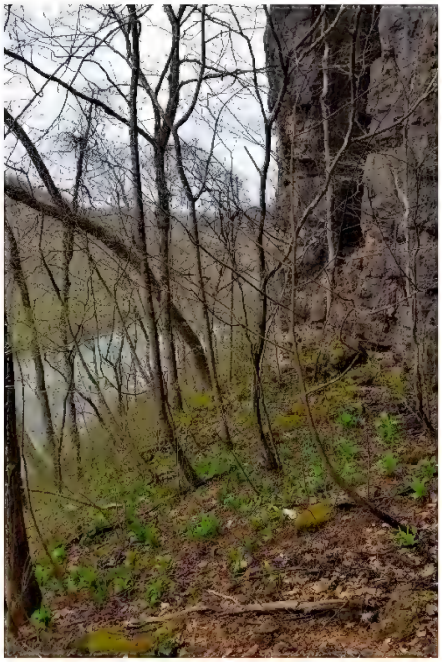

Figure 31. This dolomite talus slope situated at the base of the high dolomite cliffs of Coon Den Bluff stretches over 0.5 mile along the banks of Bryant Creek. Trees and understory seen here include sycamore (*Platanus occidentalis*), northern red oak (*Quercus rubra*), chinquapin oak (*Q. muehlenbergii*), slippery elm (*Ulmus rubra*), pawpaw (*Asimina triloba*), and bladdernut (*Staphylea trifolia*). Emerging rosettes of false hellebore (*Veratrum woodii*) are prominent along with emerging sedges, ferns, and many spring ephemerals.

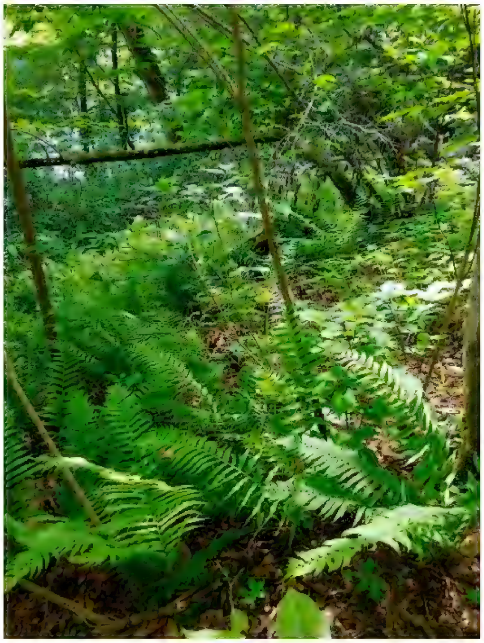

Figure 32. Narrow-leaved spleenwort (*Diplazium pycnocarpon*) is known only from the dolomite talus slopes of Coon Den Bluff.

Dolomite Talus

In addition to the trees found in mesic dolomite forests of steep lower valleys, the talus slope at the base of Coon Den Bluff also has chinquapin oak (*Quercus muehlenbergii*), bur oak (*Quercus macrocarpa*), hackberry (*Celtis occidentalis*), and green ash (*Fraxinus pennsylvanica*). While bladdernut (*Staphylea trifolia*) and pawpaw (*Asimina triloba*) are dominant, other understory shrubs and small trees found only along the talus slope and lower dolomite ledges include pagoda dogwood (*Cornus alternifolia*), black haw (*Viburnum prunifolium*), ninebark (*Physocarpus opulifolius*), and wild hydrangea (*Hydrangea arborescens*).

A host of more restricted but dominant herbaceous species occupy the talus zone below Coon Den Bluff. These include the spring dominants white bear sedge (*Carex albursina*), Carey's sedge (*C. careyana*), James sedge (*C. jamesii*), false hellebore (*Veratrum woodii*), Jack-in-the-pulpit (*Arisaema triphyllum*), blue cohosh (*Caulophylllum thalictroides*), white baneberry (*Actaea pachypoda*), black cohosh (*A. racemosa*), and running strawberry (*Euonymus obovatus*). This site is the only known location in the park for narrow-leaved spleenwort (*Diplazium pycnocarpon*), forming dense colonies along the mid to lower slopes of the talus zone along with fragile fern (*Cystopteris protrusa*), Tennessee fern (*C. tennesseensis*), maidenhair fern (*Adiantum pedatum*), walking fern (*Asplenium rhizophyllum*), and Christmas fern (*Polystichum acrostichoides*). Prominent summer-flowering species include purple Joe-Pye weed (*Eupatorium purpureum*), blue-stemmed goldenrod (*Solidago caesia*), and mad-dog skullcap (*Scutellaria lateriflora*).

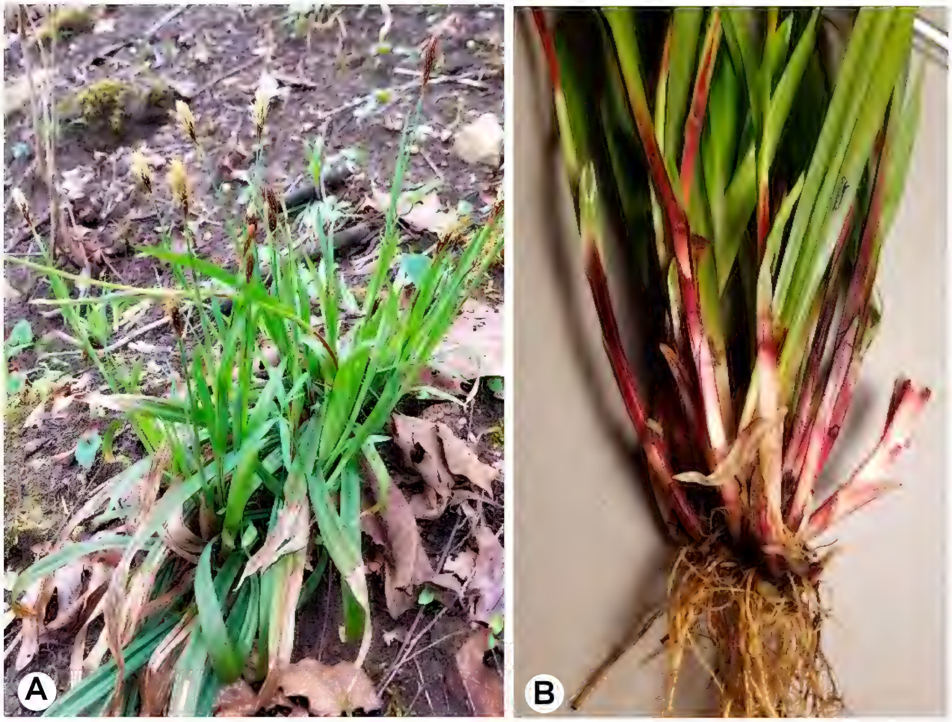

Figure 33. A: Carey's sedge (*Carex careyana*) sends up culms with bright yellow stamens contrasting with deep crimson scales of flowering spikes in the early spring. **B:** Deep purple wine-colored bases of culms are diagnostic.

Where dolomite rocks of various sizes form talus debris, the following characteristic species become prominent: Virginia waterleaf (*Hydrophyllum virginianum*), Canada waterleaf (*H. canadense*), leafcup (*Polymnia canadense*), goosefoot (*Chenopodium standleyanum*), and Enchanter's nightshade (*Circaea canadense*).

Moist Dolomite Cliff

A careful hike along the unstable base pediment of the high cliffs of Coon Den Bluff will reveal flora associated with shaded, north-facing, often seepy ledges, overhangs, dripping falls, and moist or wet portions of the cliff face. Hiking from along the cliff base, one will hug moist dolomite cliff while being careful not to stumble down rugged rocky dolomite talus downhill. This linear natural community stretches nearly 3,000 feet, among the longest (along with moist dolomite talus and cliff face) in the southern Ozarks. Looking upward, the uninterrupted drier cliff face along the way is broken occasionally by cascades of small dripping falls and sheets of seepy calcite coating the cliff face above, often a hundred feet to its origin along the impervious high cliff edge (permanent seeps are described under groundwater natural communities).

Characteristic shrubs include wild hydrangea (*Hydrangea arborescens*), ninebark (*Physocarpus opulifolius*), elderberry (*Sambucus canadensis*), arrow-wood (*Viburnum molle*), and bladdernut (*Staphylea trifolia*). Characteristic herbs and ferns of moss-covered moist ledges and cracks include shooting star (*Primula meadia*), columbine (*Aquilegia canadensis*), goats' beard (*Aruncus dioicus*), false hellebore (*Veratrum woodii*), bristle-leaved sedge (*Carex eburnea*), white bear sedge (*C. albursina*), Tennessee bladder fern (*Cystopteris tennesseensis*), walking fern (*Asplenium rhizophyllum*), clearweed (*Pilea pumila*), rue anemone (*Thalictrum thalictroides*), smooth solomon's seal (*Polygonatum biflorum*), and blue-stemmed goldenrod (*Solidago caesia*). The fine clayey wind-blown damp to wet soil of overhang recesses often harbor pellitory (*Parietaria pensylvanica*), bristle-leaved sedge (*Carex eburnea*), maple-leaved goosefoot (*Chenopodium simplex*), and cowbane (*Oxypolis rigidior*).

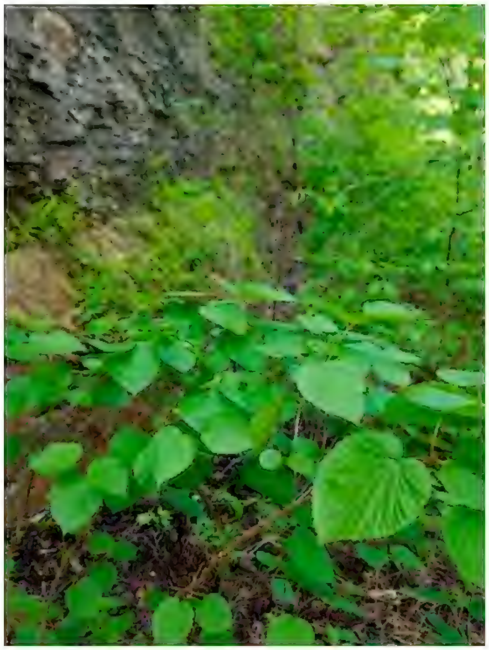

Figure 34. Arrow-Wood (*Viburnum molle*) with its heart-shaped leaves (above) is often mistaken for wild hydrangea (*Hydrangea arborescens*). Arrow-wood occurs along moist dolomite ledges at the base of the dolomite cliffs along Coon Den Bluff. It is listed in the Species of Conservation Concern checklist (MDC 2022) as Status Undetermined.

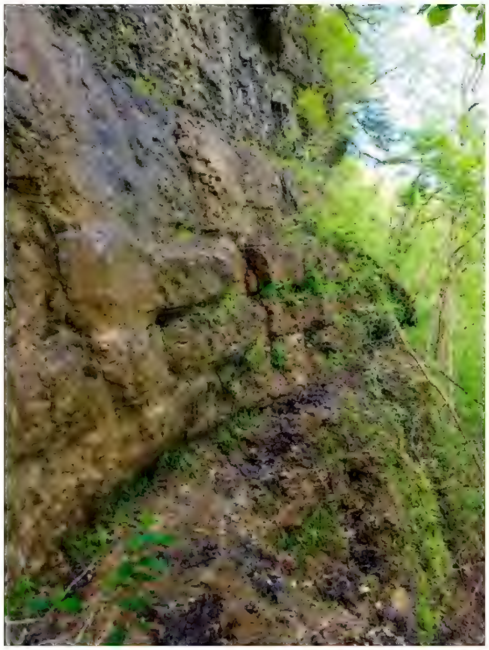

Figure 35. Madicolous species (growing on a film or thin sheet of water on rock) are abundant along water-covered rock surfaces; these include liverworts, mosses, algae, fungi, and cyanobacteria. Vascular plants here include hidden spikemoss (*Selaginella eclipes*), water pimpernel (*Samolus parviflorus*), small-flowered alumroot (*Heuchera parviflora* var. *puberula*), and bulblet fern (*Cystopteris bulbifera*).

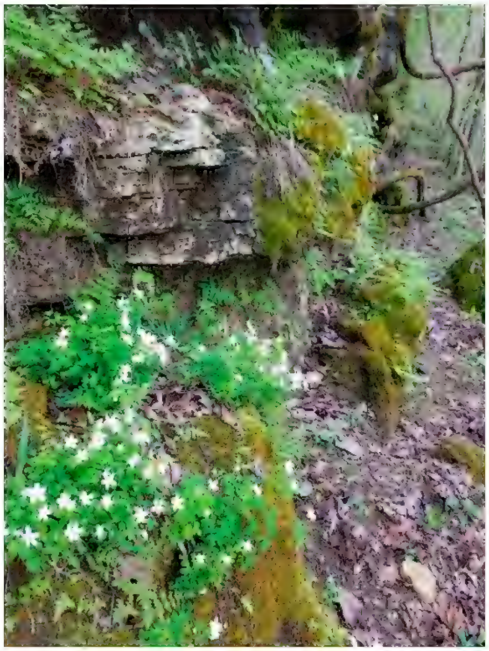

Figure 36. Rue anemone (*Thalictrum thalictroides*) forms white-flowered bouquets among the pendulous fronds of bublet fern (*Cystopteris bulbifera*).

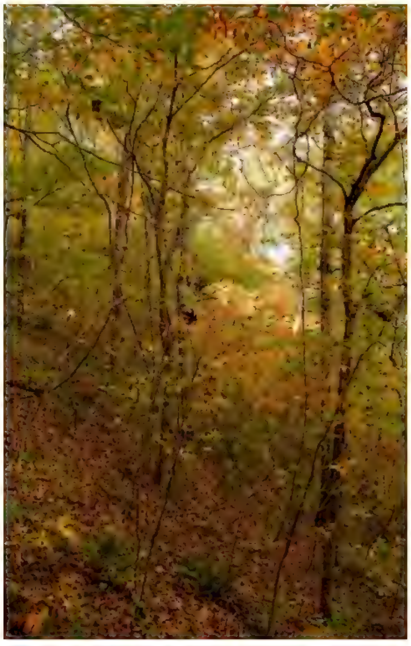

Figure 37. At over 0.5 miles long and 1,000 feet wide, old growth dry-mesic forest is perched precariously on this near 45° north-facing slope where two small landslides have occurred.

Dry-Mesic Sandstone Forest

This natural community is common, especially along moderately steep mid to lower slopes of north- and east-facing hills and breaks, notably in the deeper valleys north of Highway N.

Moderately deep soils are derived from gravelly sandstone residuum or slope alluviums. Especially dramatic is the very steep hillslope above the dolomite cliffs of Coon Den Bluff where Coulstone and Bender sandstone soils are exclusive to the development of dry-mesic sandstone forests.

As **Figure 37** shows, a dense closed canopy of tall oaks and other hardwoods overtops a well-developed understory of flowering dogwood. White oak (*Quercus alba*), northern red oak (*Q. rubra*), and sugar maple (*Acer saccharum*) dominate along with a scattering of black gum (*Nyssa sylvatica*), mockernut hickory (*Carya tomentosa*), and red maple (*Acer rubrum*). Eastern hop hornbeam (*Ostrya virginiana*), Carolina buckthorn (*Rhamnus caroliniana*), and sassafras (*Sassafras albidum*) mix with flowering dogwood (*Cornus florida*) in the understory.

Ferns are prominent in the groundcover, including marginal shield fern (*Dryopteris marginalis*) and Christmas fern (*Polystichum acrostichoides*). Common sedges include few-fruited sedge (*Carex oligocarpa*), hairy sedge (*C. hirtifolia*), and Bellow's beaked sedge (*C. albicans*). Shining bedstraw (*Galium concinnum*), Buckley's goldenrod (*Solidago buckleyi*), spring beauty (*Claytonia virginiana*), elm-leaved goldenrod (*Solidago ulmifolia*), bare-stemmed tick trefoil (*Hylodesmum nudiflorum*), and blue lettuce (*Lactuca floridana*) are characteristic species. Three orchid species occur in the rich deep organic leaf litter of the dry-mesic forest floor: small yellow lady's slipper (*Cypripedium parviflorum*) is most abundant here, and the rare rattlesnake plantain (*Goodyera pubescens*) is isolated in sandy soil above the cliff ledge; only one occurrence (**Figure 38**) of late coral root (*Corallorhiza odontorhiza*) was found growing in deep leaf litter below large sandstone boulders.

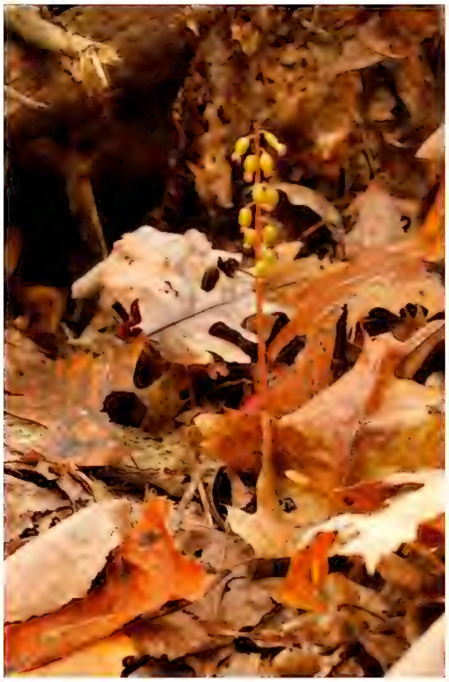

Figure 38. Late coral root (*Corallorhiza odontorhiza*) emerges in late September from deep leaf litter on a steep north slope along Coon Den Bluff.

Mesic Sandstone Forest

The thickest sandstone layer associated with the Roubidoux Formation forms the basement layer in the deepest, lowest upper valleys north of Highway N. These deep valleys are most prevalent in the upper reaches of Pike, Major, and West hollows. The sound of cascading waterfalls signifies that mesic sandstone forest is near. The waters originate from groundwater seepage along perched sandstone ledges and base rock along the stream. Groundwater and occasional rains feed these streams most of the growing season until late summer drought conditions slowly dry them out.

Mesic sandstone forests are relatively easy to identify. Descending into the deepest of headwater valley coves that parallel the longer hollows, a thicker, denser zone of mixed hardwoods and understory trees and shrubs forms narrow linear margins along the ephemeral streams (some with permanent pools). This zone often begins at lower elevations where sandstone boulders and rubble of steep draws intersect the lowest sandstone layer of the Roubidoux Formation. From this point to the main valley, a dense shrub layer of spicebush (*Lindera benzoin*) and American hazelnut (*Corylus americana*) marks the narrow zone.

Among the mixed hardwoods are white oak (*Quercus alba*), bitternut hickory (*Carya cordiformis*), sugar maple (*Acer saccharum*), black walnut (*Juglans nigra*), slippery elm (*Ulmus rubra*), and white ash (*Fraxinus americana*). Pawpaw (*Asimina triloba*), blue beech (*Carpinus caroliniana*), and red mulberry (*Morus rubra*) are scattered among the spicebush.

Another prominent floristic element is the dominance of fern species. These include maidenhair fern (*Adiantum pedatum*), broad beech fern (*Phegopteris hexagonoptera*), Christmas fern (*Polystichum acrostichoides*), and rattlesnake fern (*Botrychium virginianum*). Herbaceous plants include grass sedge (*Carex jamesi*), narrow-leaved wood sedge (*C. digitalis*), smooth solomon’s seal (*Polygonatum biflorum*), bellwort (*Uvularia grandiflora*), small-flowered tick trefoil (*Hylodesmum pauciflorum*), wild geranium (*Geranium maculatum*), and blue-stemmed goldenrod (*Solidago caesia*). Rattlesnake plantain (*Goodyera pubescens*) and crane-fly orchid (*Tipularia discolor*) are two rare orchids found most often in the upper deep sandstone ravines. Spicebush terrace seeps and ravine side slope seeps are always directly associated with this natural community.

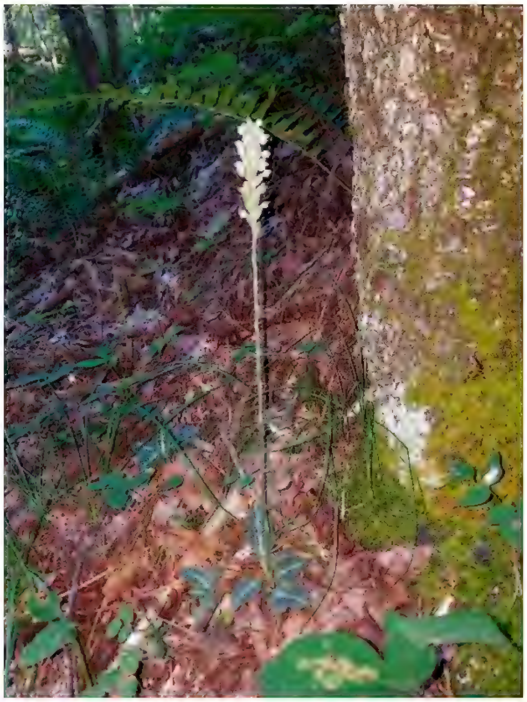

Figure 39. Rattlesnake plantain (*Goodyera pubescens*) is rare in mesic sandstone ravines.

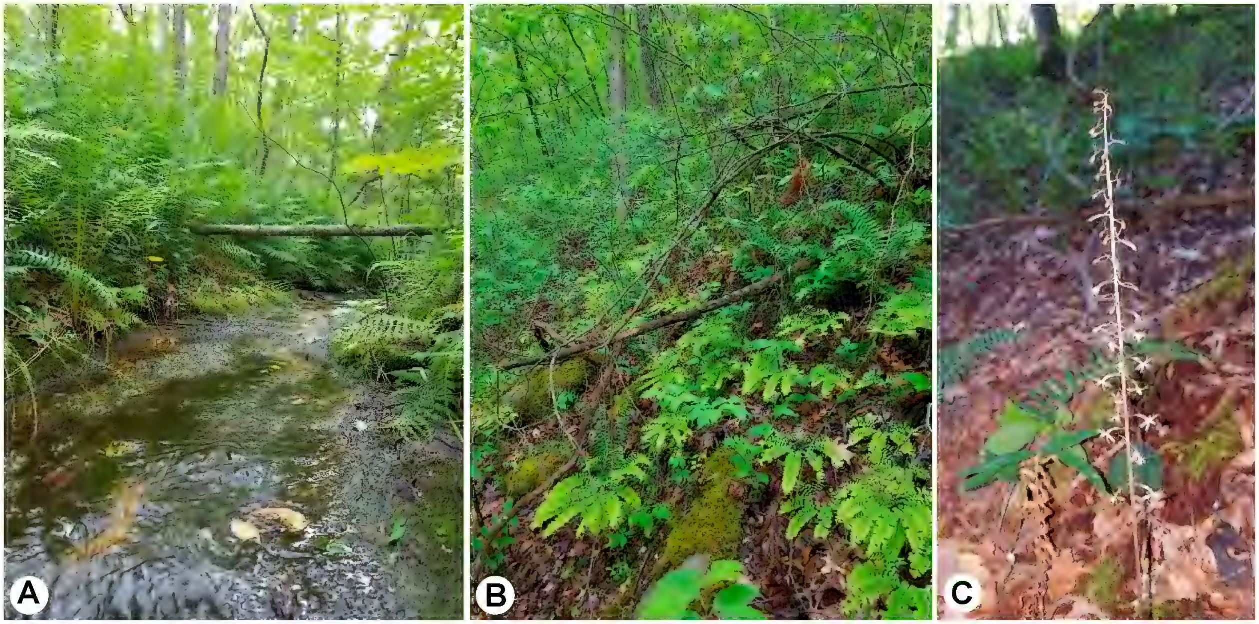

Figure 40. A: Groundwater seepage collecting on impervious sandstone bedrock in a ravine creating moist soil conditions for the development of a fern-dominated mesic sandstone forest. The fern shown along the edge of the drainage is silvery spleenwort (*Diplazium acrostichoides*). **B:** Maidenhair fern (*Adiantum pedatum*) and Christmas fern (*Polystichum acrosticoides*) are widespread throughout all mesic sandstone forests. **C:** Crane-fly orchid (*Tipularia discolor*) is a species of conservation concern (status undetermined) growing in the rotting debris of a log in a deep mesic sandstone ravine.

Moist Sandstone Cliff

Moist sandstone cliffs resemble dry sandstone cliffs except for the degree of exposure. Sandstone cliffs become moist generally when facing north or eastward, when protected in deep coves and ravines, and due to canopy shading. At the park, the linear feet of moist sandstone cliff may exceed that of dry sandstone cliff. Cliffs are 10 feet or higher vertical rock faces, often including rock shelters and overhangs. Hundreds of feet of sandstone ledges, outcrops, and boulders less than 10 feet in height form parallel benches extending many feet horizontally along elevation contours on mid and upper slopes of ridges and valleys throughout the park. Sandstone cliffs in the park are relatively small, ranging from 10-20 feet high. However, the difference between this height and the lesser, more abundant ledges of 3 to 10 feet do not seem to make any difference in the occurrence of plant species associated with cliff features.

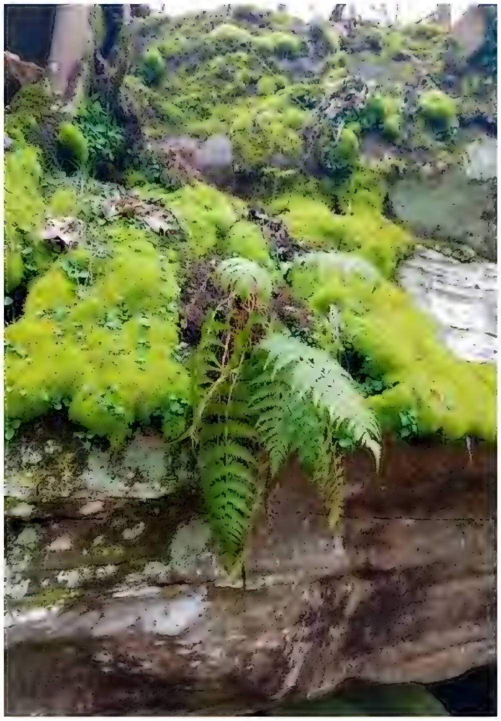

Figure 41. Marginal shield fern (*Dryopteris marginalis*) is anchored in dense mats of moss and lichen cushions along this moist sandstone ledge.

Lichens, liverworts, and mosses form a dense cover on moist sandstone cliffs, ledges, and boulders. The quantity and diversity of cryptogams (lichens, fungi, liverworts, mosses) is higher than other natural communities, and warrants further study.

Characteristic vascular species include wild hydrangea (*Hydrangea arborescens*), resurrection fern (*Polypodium polypodioides*), marginal shield fern (*Dryopteris marginalis*), black spleenwort (*Asplenium resiliens*), bulbous cress (*Cardamine bulbosa*), Pennsylvania bitter cress (*Cardamine pensylvanica*), tall white lettuce (*Nabalus latissimus*), blue-stemmed goldenrod (*Solidago caesia*), and sharp-leaved goldenrod (*Solidago arguta*).

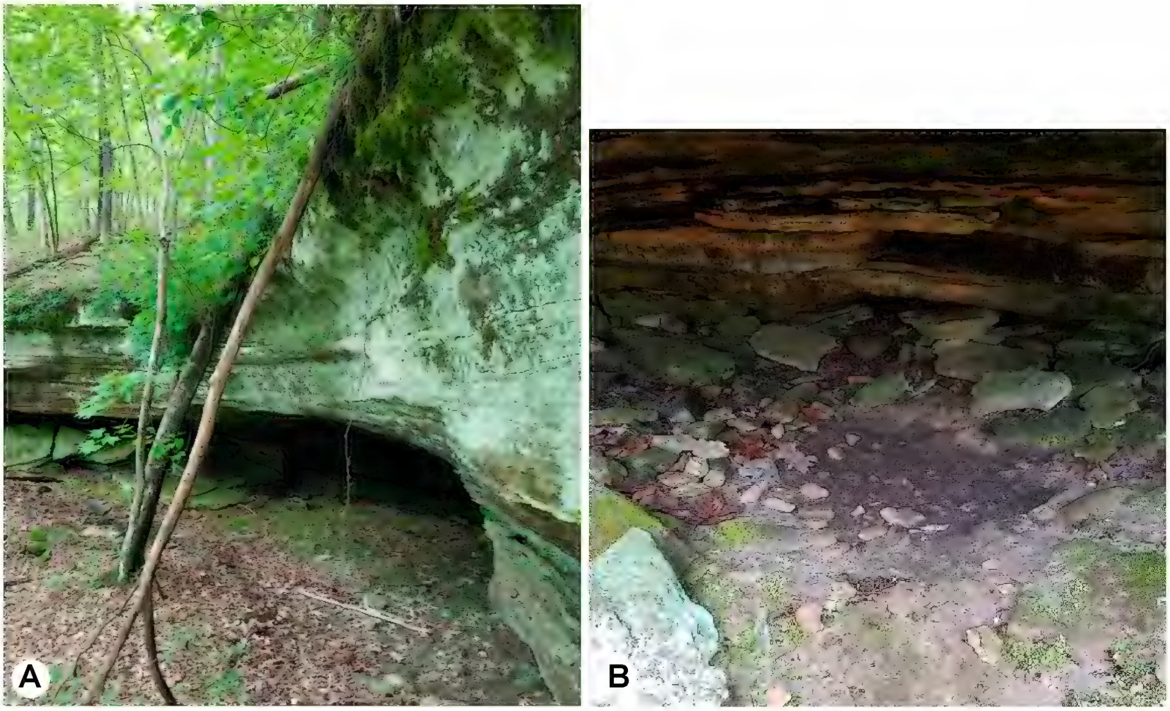

Figure 42. A: This 20-foot-high moist sandstone cliff of the Roubidoux Formation is one of two sandstone ledge outcrops occurring just below the crest of flat ridges above. **B:** Bear beds occur in several ledge recesses like the one shown here.

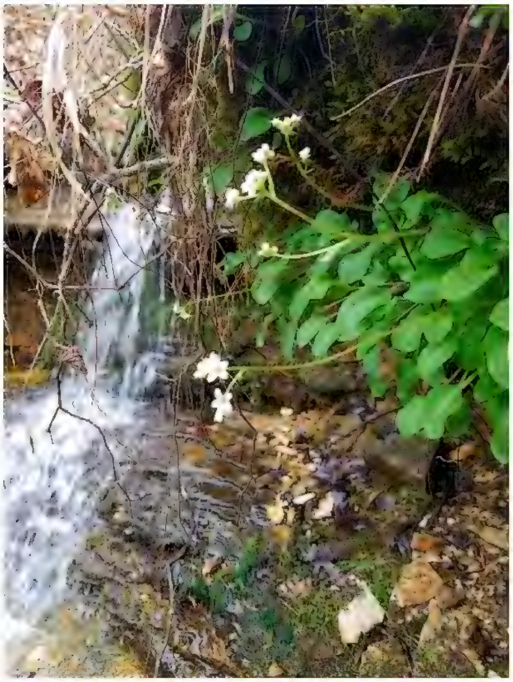

Figure 43. Palmer's saxifrage (*Micranthes palmeri*) grows only on moist sandstone ledges, particularly around waterfalls and shaded ledges in deep ravines.

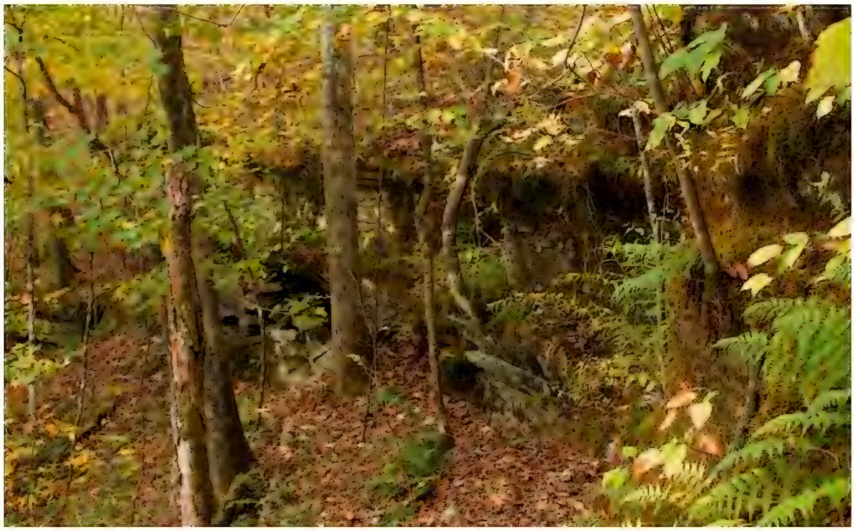

Figure 44. Early fall flora confined to moist sandstone ledges here include blue-stemmed goldenrod (*Solidago caesia*), marginal shield fern (*Dryopteris marginalis*), and wild hydrangea (*Hydrangea arborescens*). This moist sandstone cliff/ledge extends ¼ mile along the upper slopes of Coon Den Bluff.

Flora of Groundwater Natural Communities

Groundwater natural communities in the park include Ozark fens, dolomite spring runs, seeping calcitic deposits on cliff faces, and neutral to acidic seeps. The juxtaposition of the park's three primary geologic units is key to the manifestation, distribution, hydrology, and chemistry of the park's fens, marly seeps, and neutral/acid seeps. Groundwater seepage in the proximity of Jefferson City dolomite tends toward higher alkalinity and the presence of marly deposits. The park's largest Ozark fen occurs directly above a contact zone of exposed Jefferson City dolomite and bordering dolomite glade. Alkalinity and calcitic minerals result in a suite of plants not found in the neutral to slightly acidic "spicebush seeps" found elsewhere and more directly associated with Roubidoux sandstone bedrock layers in upper headwater valleys and narrow ravines. Spicebush terrace seeps often occur where groundwater contacts a perched Roubidoux sandstone layer on the lower steep side slopes of ravines or valleys.

A small but floristically significant acid seep occurs at the base of the park's only known sandstone glade. Water exits from the base of gravel deposits extending along the base of a 30-foot-long sandstone ledge, home to a population of prickly bog sedge (*Carex atlantica* subsp. *atlantica*). Other associates include umbrella grass (*Fuirena simplex*), stout rush (*Juncus nodatus*), slender spike rush (*Eleocharis verrucosa*), orange coneflower (*Rudbeckia fulgida* var. *palustris*), and marsh spikemoss (*Selaginella apoda*).

Along both Coon Den Bluff and Pearce Bluff, water percolating through the Roubidoux formation meets an impervious dolomite layer atop the Gasconade Formation at the highest cliff ledge. Many of these seeps form dripping curtains across several hundred feet of 100-foot-tall vertical cliff face, with a few cascading or seeping the entire 100 foot drop down the cliff face.

This constant calcareous seepage leads to thick deposits of calcite coating many bluff faces and ledges. Permanent drip zones abound.

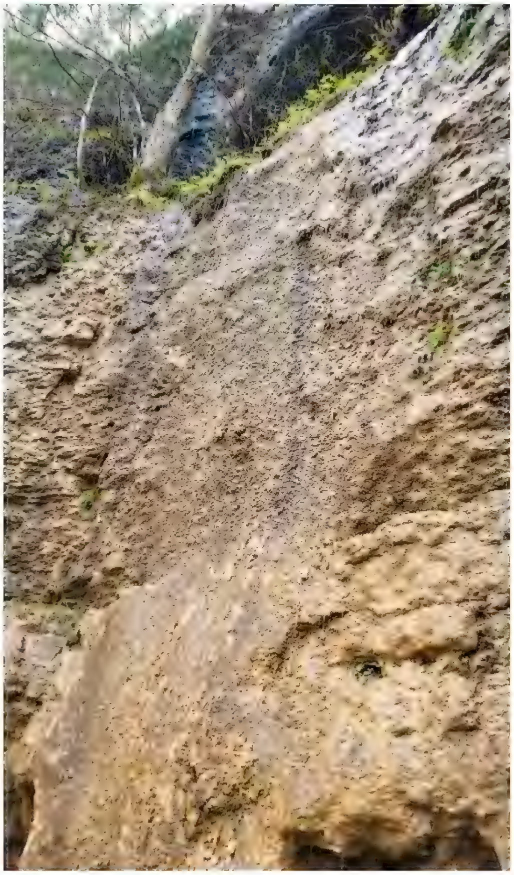

Figure 45. Emerging from the ledge above, a wet weather spring deposits sheets of calcite on the dolomite below.

Ozark Fen

Several small fens occur in the park associated with the contact between the Jefferson City and Roubidoux Formation. The largest fen (**Figure 46**) is located along the north border of the graben along the mapped fault. Known in the park only from this Ozark fen are prairie blazing star (*Liatris pycnostachya*), common water horehound (*Lycopus americanus*), prairie Indian plantain (*Arnoglossum plantagineum*), sneezeweed (*Helenium autumnale*), stiff aster (*Oligoneuron album*), and yellow-flowered horse gentian (*Triosteum angustifolium*).

Grass-of-Parnassus (*Parnassia grandifolia*), orange coneflower (*Rudbeckia fulgida* var. *palustris*), common golden ragwort (*Packera aurea*), common mountain mint (*Pycnanthemum virginianum*), and prairie straw sedge (*Carex suberecta*) occur in a small fen in the southwest portion of the park.

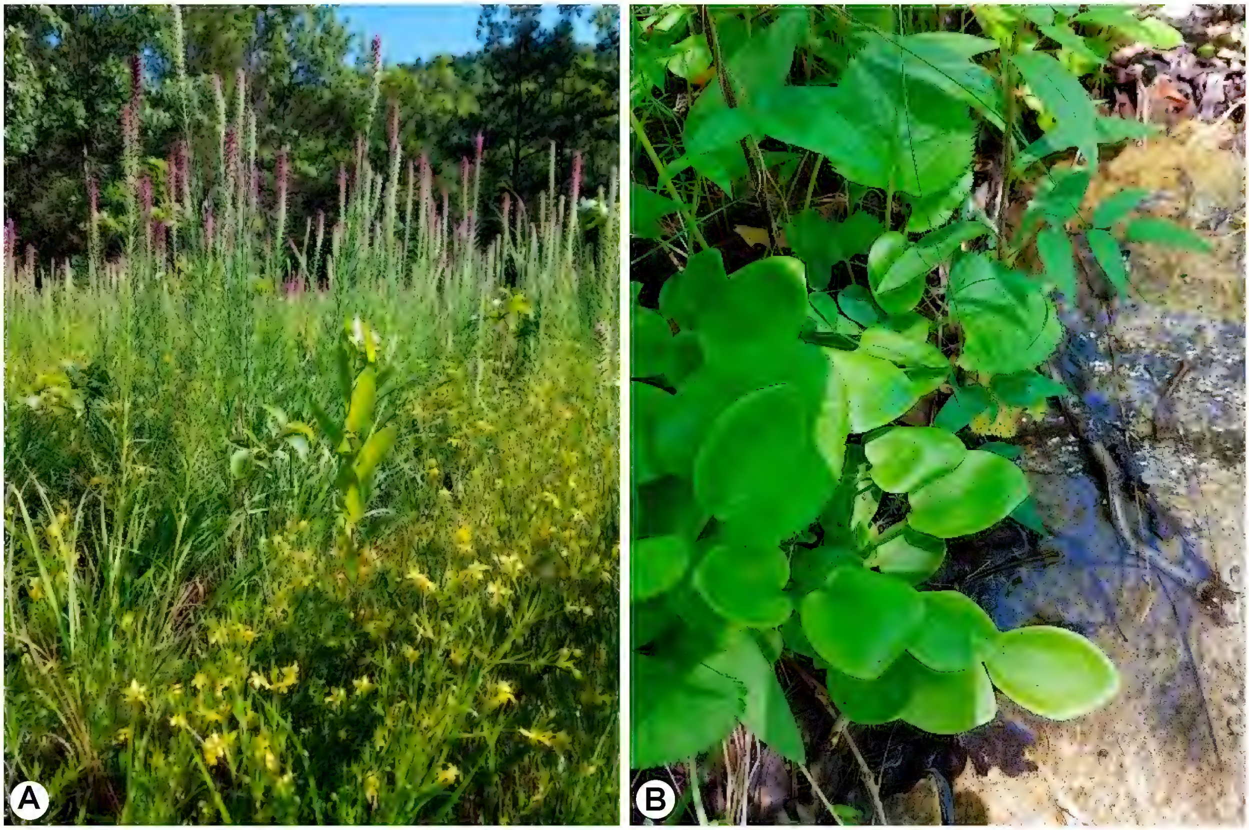

Figure 46. A: The park's largest Ozark fen occurs along the edge of a graben. Prairie blazing star (*Liatris pycnostachya*), narrow-leaved loosestrife (*Lysimachia* ***quadriflora***), and prairie dogbane (*Apocynum cannabinum*) are visible in this image. **B:** Identifiable Ozark fen species include Grass-of-Parnassus (*Parnassia grandifolia*), common golden ragwort (*Packera aurea*), groundnut (*Apios americana*), and rough-leaved goldenrod (*Solidago rugosa* var. *rugosa*).

Spicebush Terrace/Ledge Seeps

Spicebush (*Lindera benzoin*) dominates the mucky, slightly acidic seeps scattered along impervious sandstone bedrock of deep ravines and valley terraces. These seeps occur along a perched water table that exits the contact between the lowermost thick sandstone layer of the Roubidoux Formation and the porous weathered dolomites above it. Where the impervious sandstone base rock lies just beneath a narrow valley, mucky seepage blankets the valley floor. Dense shrub thickets of spicebush (*Lindera benzoin*) cover these valley terraces.

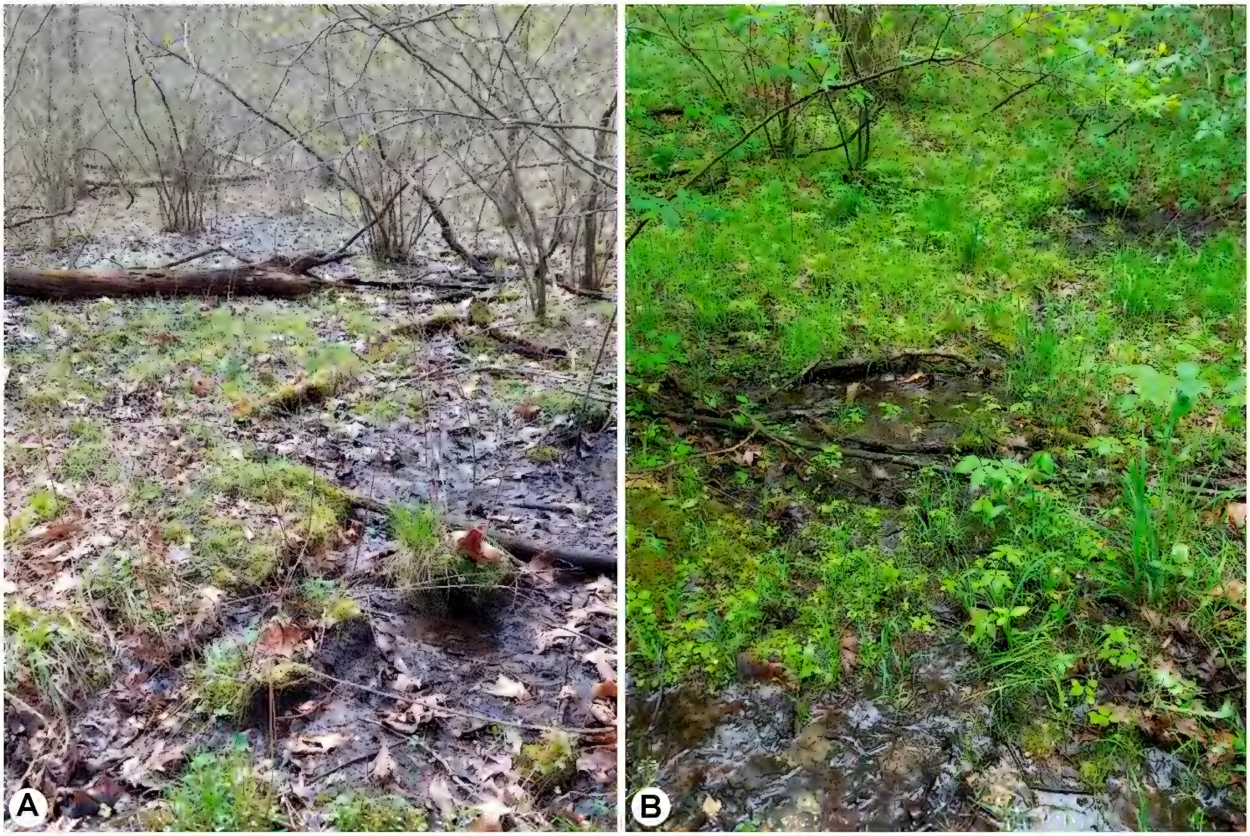

Figure 47. A: The late winter drab organic deep muck of this spicebush-dominated terrace seep will soon transform into a lush variety of ferns, sedges, and wildflowers. **B:** Sedges and herbs emerge as spring progresses.

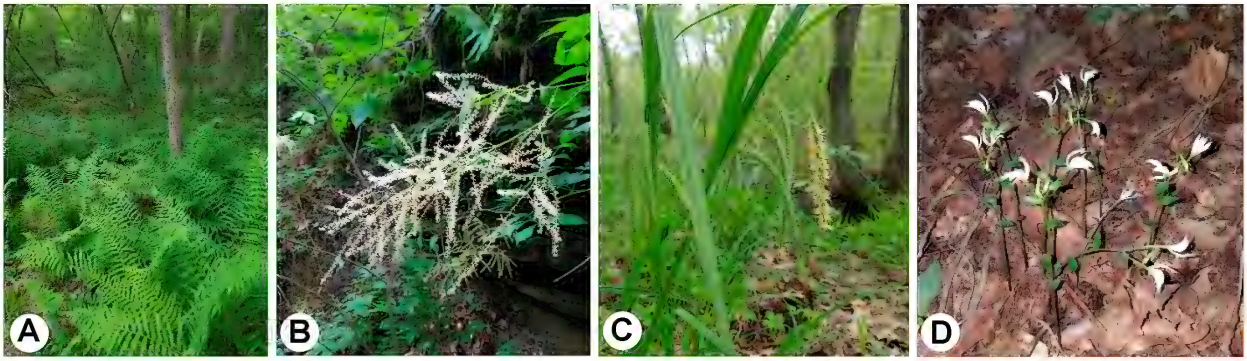

Figure 48. A: Silvery spleenwort (*Diplazium acrostichoides*); **B:** Goat's beard (*Aruncus dioicus*); **C:** nodding pogonia (*Triphora trianthophora*); and **D:** fringed sedge (*Carex crinita*) found in spicebush terrace seeps.

Characteristic herbaceous species of the seeps are water hemlock (*Cicuta maculata*), water parsnip (*Sium suave*), orange jewelweed (*Impatiens capensis*), fowl manna grass (*Glyceria striata*), and bulbous cress (*Cardamine bulbosa*). Several plants are confined only to spicebush seeps including fringed sedge (*Carex crinita*), bottlebrush sedge (*C. hystericina*), slender satin grass (*Muhlenbergia tenuiflora*), and lady fern (*Athyrium filix-femina*).

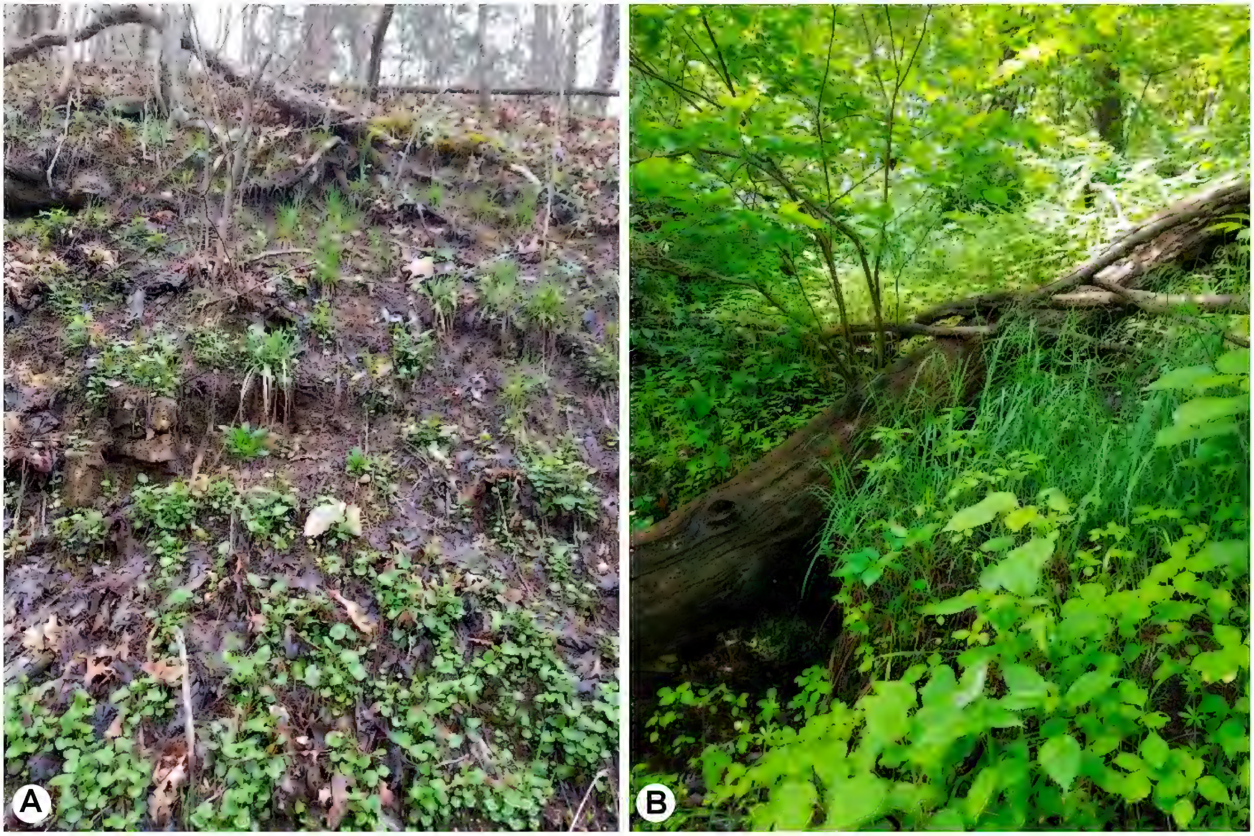

Figure 49. A: Precipitation percolates through the pervious fragmented dolomite and sandstone parent material of a dry sandstone woodland (seen in top of the image). This groundwater runs along the impervious sandstone bedrock layer and exits where eroded and exposed along ravines. Emerging leaves of the common golden ragwort (*Packera aurea*) dominate this slope along with sedges. **B:** A spicebush seep appears on top of an impervious sandstone ledge. This seep is the park's only known location for lady fern (*Thelypteris filix-femina*). Other species shown include orange jewelweed (*Impatiens capensis*), fowl manna grass (*Glyceria striata*), sweet-scented bedstraw (*Galium triflorum*), and wood nettle (*Laportea canadensis*).

Dolomite Spring

The Ozark Highlands is one of the country's most significant karst landscape, having the highest concentration of springs in the United States. Springs, sinkholes, solution pockets, caves, and losing streams are solution features of carbonate rock. The primary karst area of Bryant Creek State Park is located where the Gasconade and Jefferson City formations occur. The park's named springs include Coon Den and Columbus, both located along the base of the cliffs along Coon Den Bluff, and Pike Spring in Pike Hollow.

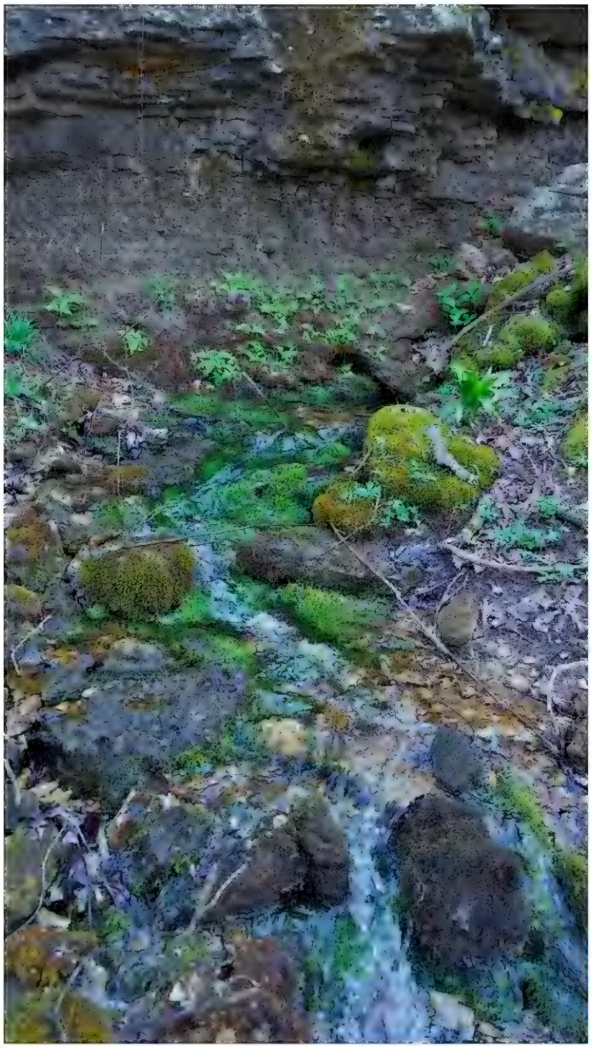

Figure 50. The author located another unnamed significant spring at the base of Pearce Bluff.

Early settlers built a homestead (now gone) near a rock-lined spring that emerges along the base of a dolomite ledge east of the main dolomite glade knob. This spring flows most of the year, crossing under a road culvert of the main logging road east of the glade.

Plant species noted along dolomite spring runs include fowl manna grass (*Glyceria striata*), great blue lobelia (*Lobelia siphilitica*), bulbous cress (*Cardamine bulbosa*), Dudley's rush (*Juncus dudleyi*), water cress (*Nasturtium officinale*), winged monkey flower (*Mimulus alatus*), ground nut (*Apios americana*), and sallow sedge (*Carex lurida*).

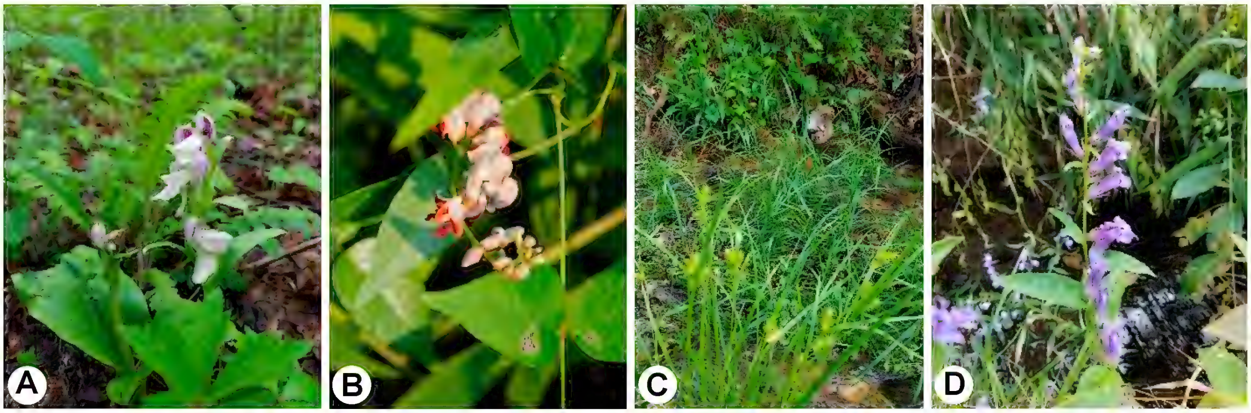

Figure 51. A: The only known location for showy orchids (*Galearis spectabilis*) is at Pike Spring. **B:** Ground nut (*Apios americana*) growing along a spring branch at a culvert crossing. **C:** Sallow sedge (*Carex lurida*) frequents dolomite springs. **D:** Very common great blue lobelia (*Lobelia siphilitica*) along dolomite spring run.

Riparian Natural Communities Along Bryant Creek

Originating in Cedar Gap Conservation Area 25 miles to the northwest, Bryant Creek flows nearly 40 miles before entering the park. Additionally, its watershed includes dozens of small streams and valley tributaries including Rippee, Hunter, Whites, Macks, and Puncheon Camp creeks — collectively totaling more than 80 miles of permanent stream flow. Floodwaters above the park transport the propagules and seeds of many plant species, which at any time can occur along the stream corridor through the park. Seed dispersal by water (hydrochory) is an important mechanism for dispersal of riparian species (Nilsson et al. 2010), and is a primary contributor to the plant species diversity at the park. Likewise, cultural development in the watershed above the park also contributes to the water-born dispersal of adventive species.

Sand is a major component of accreted sediment within the floodplain of Bryant Creek. This sandy substrate is prominent in riverfront forests and sandbars. While the park boundary intersects only small portions of riverfront and sandbar natural communities, the periodic flooding of Bryant Creek transports characteristic sand-loving or sand tolerant flora throughout the river system, where they find suitable conditions for successful establishment. Thus, plant species found in proximity to the park boundary along Bryant Creek are included here. Hydrochorous dispersal also contributes to the dispersal of non-typical riparian species in riparian zones.

Bryant Creek is subject to violent, moderate gradient flash flooding. These flash floods transport high volumes of sand, pebbles, gravel, and large stones, often deposited in deep shifting amounts. Flood events create unstable, dynamic boundary transitions among natural communities associated with riparian systems. Gravel wash, gravel bar, mudflat, streambank, and riverfront natural communities are subject to constant shifting boundaries. Figures 50-53 below demonstrate the rapidity in which the stream course can shift in the span of 2-3 years and be rapidly colonized by characteristic flora. Streambanks along the most entrenched portions (cliffs, talus slopes, boulders, rock ledges, forested edges) of the river border are more stable while gravel bars, sloughs, and riverfront forests are subject to constant change.

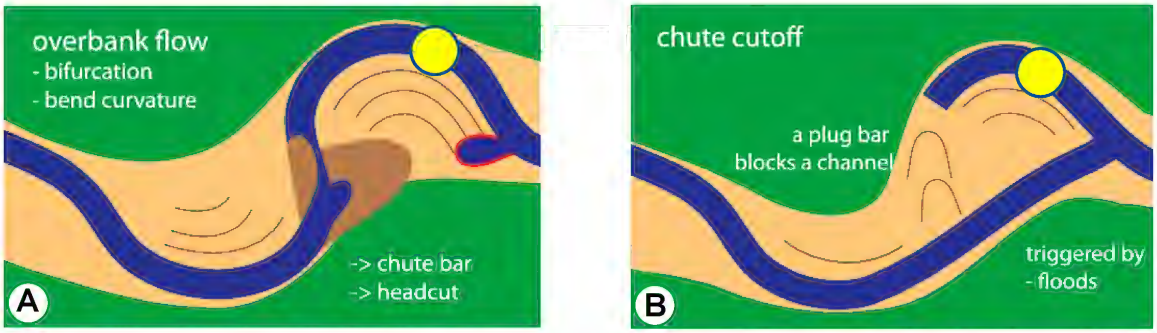

Figure 52. Follow the yellow dot in this and the next three figures. This conceptual model shows the process of the chute cutoff development (van Dijk et al. 2012) for the stream bend of Bryant Creek across from Coon Den Bluff shown in **Figures 53-55**. **A:** Shows rapid bend development where a chute bar develops over the downstream point bar causing further excavation of a chute through the chute bar. A downstream edge backcuts upward, eventually connecting to the upstream chute. **B:** Shows that the old meander bend now has an unfavorable entrance curvature leading to the rapid capture of bed sediment and formation of a plug bar. The result is the formation of a stagnant slough (**Figure 53**) that during just two seasons rapidly accrues wetland plant species available as transported seed in floodwaters.

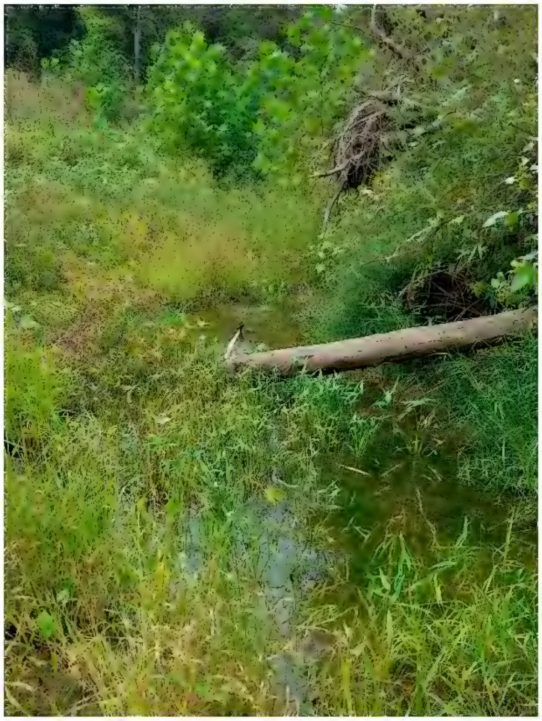

Figure 53. Image taken at the yellow dot shown in **Figure 52**. This location was the main stream channel two years earlier. Nearly all the herbaceous plants shown in this image originated from transported seeds in two years. Most of the species listed under mudflat-slough below were documented at this location, having rapidly sorted out into vegetative zones.

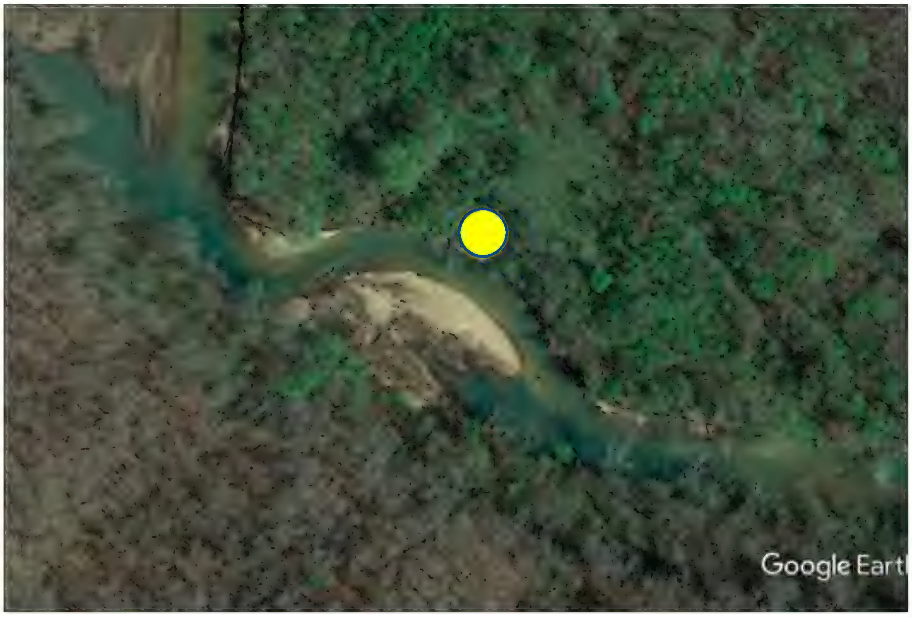

Figure 54. Aerial image taken April of 2015, note the course of the stream bend (middle of image) creating an accreted gravel bar. The upstream channel is cutting to the right thus increasing the angle with the steep bluff in the bend forcing water to form a chute. This stream meander formation matches **Figure 52. A**. Refer to **Figure 55** for the same location in 2018. Source: Google Earth 2015.

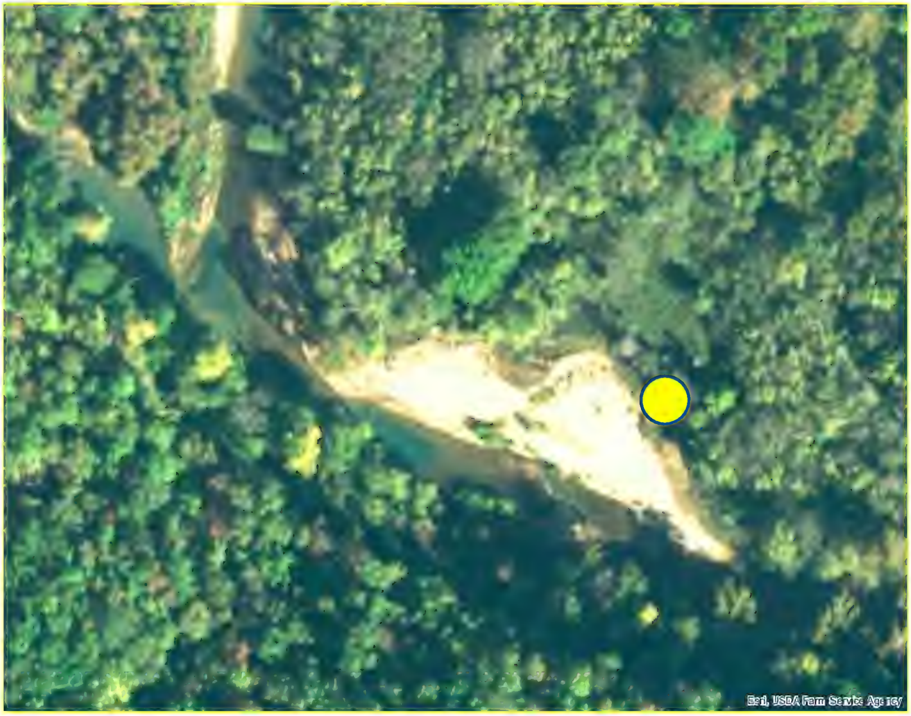

Figure 55. Three years after **Figure 54**, in 2018, the stream has abandoned the channel north of the sandbar, leaving a low water and silt-filled slough. Yellow symbol denotes image point. Source: NAIP 2018.

Mesic Bottomland Forest: Bryant Creek

The following list includes just a few of the many characteristic species occupying the narrow zone of mesic bottomland forest that immediately borders the cane-dominated (*Arundinaria gigantea*) riverfront forest along the northernmost bend of the park. Of interest is the collection of narrow-leaved woodsedge (*Carex digitalis* var. *macropoda*), which occurs further south of Missouri. Yatskievych (1999) does not include the above variety arguing that intermediate characteristics occur between this and *C. digitalis* var. *digitalis*. In contrast, Mohlenbrock (2011) recognizes this element as a distinct species in Illinois, *C. melanopoda*. From his field experience with the taxon, Justin Thomas (pers. comm.) also considers it a distinct entity.

The introduced ivy-leaved speedwell (*Veronica hederifolia*) is widespread throughout the Bryant Creek floodplain in mesic bottomland forests, and riverfront forests. It can form dense mats (Yatskievych 2013) and its future impacts on native flora are not yet known.

Characteristic plants:

Northern red oak	*Quercus rubra*
American elm	*Ulmus americana*
White oak	*Quercus alba*
White ash	*Fraxinus americana*
Hackberry	*Celtis occidentalis*
Black haw	*Viburnum prunifolium*
Pawpaw	*Asimina triloba*
Sugar maple	*Acer saccharum*
Slippery elm	*Ulmus rubra*
Carolina buckthorn	*Rhamnus caroliniana*
Hairy sedge	*Carex hirtifolia*
Grass sedge	*Carex jamesii*
Davis' Sedge	*Carex davisii*
Dwarf larkspur	*Delphinium tricorne*
Virginia wild rye	E*lymus virginicus*
Harbinger of spring	*Erigenia bulbosa*
Blue phlox	*Phlox divaricata*
Ivy-leaved speedwell	*Veronica hederifolia*
Cream violet	*Viola striata*
Green dragon	*Arisaema dracontium*
Smooth Yellow Violet	*Viola pubescens*

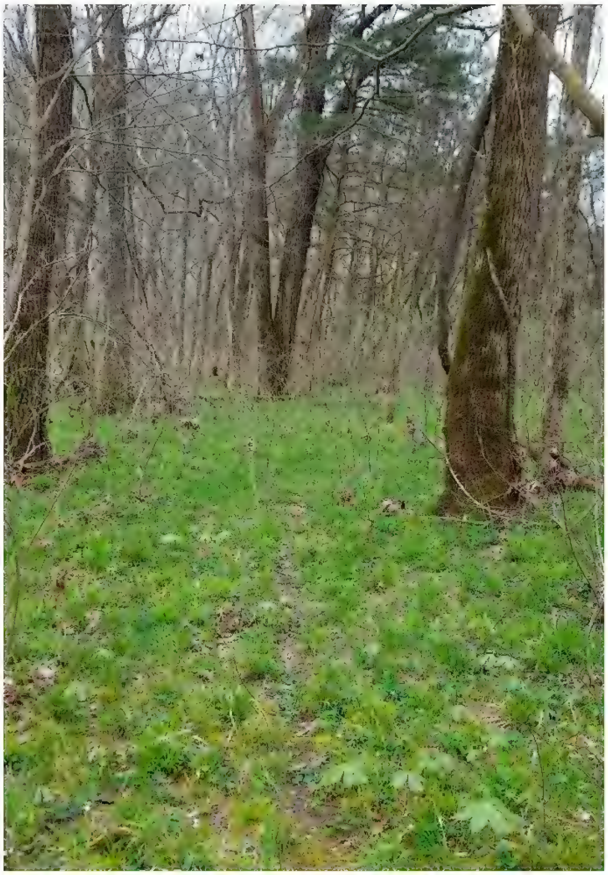

Figure 56. A narrow strip of mesic bottomland forest along the floodplain of Bryant Creek where leaf cover is scoured away by late winter floods, exposing many emerging ephemeral herbaceous plants, including those in **Figure 57**.

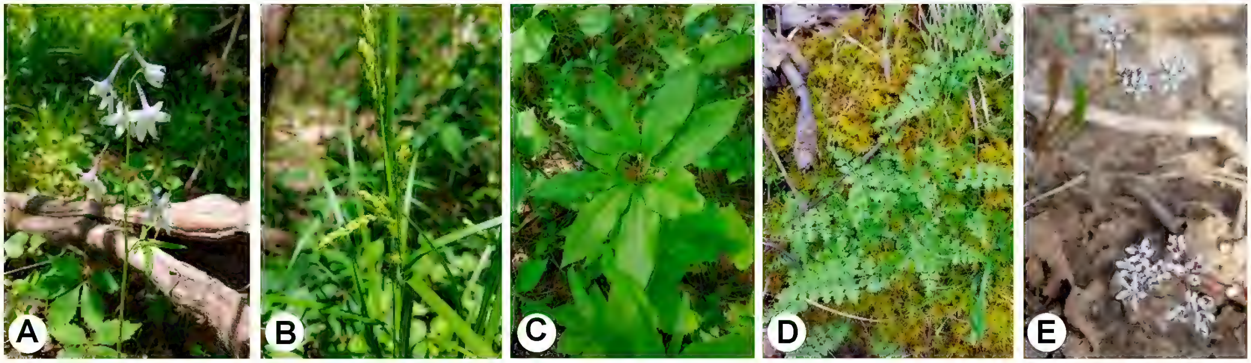

Figure 57. A: Dwarf larkspur (*Delphinium tricorne*); **B:** Davids' sedge (*Carex davisii*); **C:** green dragon (*Arisaema dracontium*); **D:** southern fern (*Cystopteris protrusa*); **E:** Harbinger of spring (*Erigynia bulbosa*).

Narrow Stream Terraces: Pike and Major Hollows

Mesic bottomland forest also occurs in narrow bands primarily in the deepest valleys of the park where alluvium is deposited as the stream gradient levels out. Only Pike Hollow, Major Hollow, and a small portion of Turkey Flat Hollow contain alluvial deposits favorable for the development of mesic soil characteristics, contrasting with the dry-mesic alluvium found in Central Hollow valley (discussed under Dry-Mesic Bottomland Woodland).

Characteristic plants:

Northern red oak	*Quercus rubra*
White oak	*Quercus alba*
Black walnut	*Juglans nigra*
Bitternut hickory	*Carya cordiformis*
Red mulberry	*Morus rubra*
Pawpaw	*Asimina triloba*
Spicebush	*Lindera benzoin*
May apple	*Podophyllum peltatum*
Grass sedge	*Carex jamesii*
Pale indian plantain	*Arnoglossum atriplicifolium*
Broad beech fern	*Phegopteris hexagonopteria*
White avens	*Geum canadense*
Putty root orchid	*Aplectrum hyemale*
Wild geranium	*Geranium maculatum*
Nodding pogonia	*Triphora trianthophora*

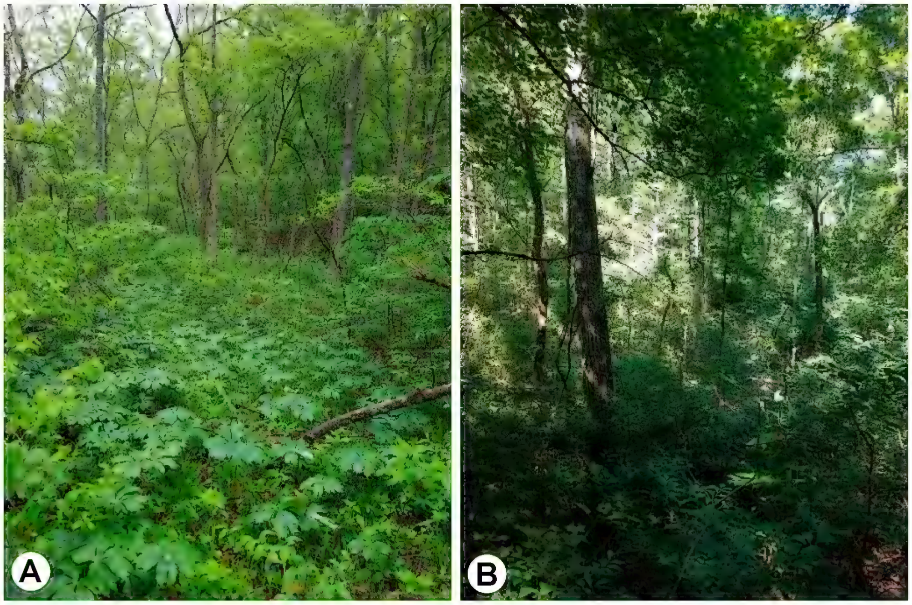

Figure 58. A: Mesic bottomland forest in stream terrace location in Pike Hollow. **B:** Mesic bottomland forest in stream terrace location in Pike Hollow; note dominance of spicebush (*Lindera benzoin*).

Riverfront Forest

At approximately 8 acres, this natural community occurs in the northernmost point of the park where Bryant Creek bends abruptly south toward Coon Den Bluff. Flood overflows scour the floodplain, transporting, removing, and depositing gravel, sand, silt and organic debris. Sycamore (*Platanus occidentalis*), box elder (*Acer negundo*), slippery elm (*Ulmus rubra*), and bur oak (*Quercus macrocarpa*) clearly define the overstory, while cane (*Arundinaria gigantea*) forms a dense thicket. Extensive riverfront forests occur upstream from the park, transporting abundant propagules for many plant species confined to this natural community type in the park, including:

Characteristic plants:

Bur oak	*Quercus macrocarpa*
Schneck oak	*Quercus schumardii*
Box elder	*Acer negundo*
Sycamore	*Platanus occidentalis*
Slippery elm	*Ulmus rubra*
Green ash	*Fraxinus pennsylvanica*
Wild golden glow	*Rudbeckia laciniata*
White crownbeard	*Verbesina virginica*
Common wood reed	*Cinna arundinacea*
Gravel bar rye	*Elymus riparius*
Virginia wild rye	*Elymus virginicus*
Bristly greenbriar	*Smilax hispida*
Sweet wormweed	*Artemisia annua*
Beefsteak plant	*Perilla frutescens*
Davis' sedge	*Carex davisii*
Wood nettle	*Laportea canadensis*
Rough hedge nettle	*Stachys tenuifolia*
Bloodleaf	*Iresine rhizomatosa*
Figwort	*Scrophularia marilandica*

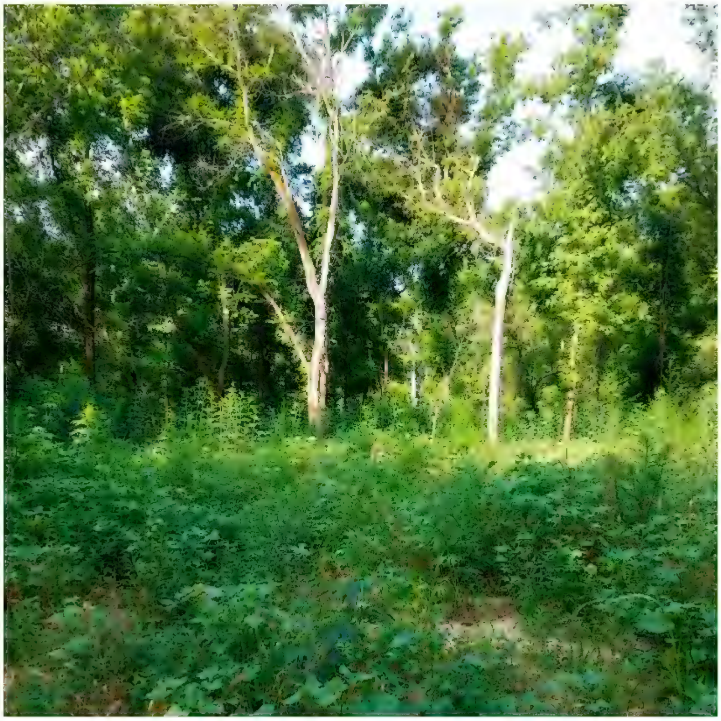

Figure 59. Annual flooding transports and deposits deep layers of sand, at the same time carrying seeds of numerous plant species as seen in this riverfront forest.

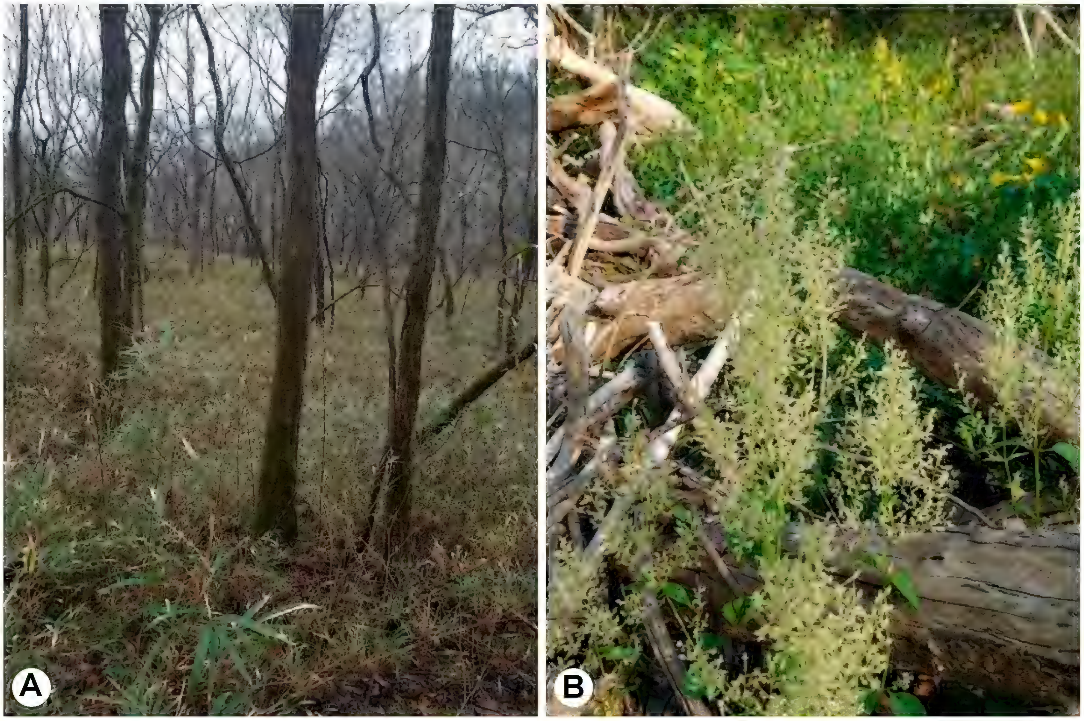

Figure 60. A: A giant cane (*Arundinaria gigantea*) thicket forms a canebrake in riverfront forest in the northernmost portion of the park. **B:** Bloodleaf (*Iresine tomentosa*) is common.

Riverbank: Bryant Creek

Approximately 1.7 miles of Bryant Creek directly borders the park for a total of nearly 4 miles of streambank along both sides of the stream. Of this, relative amounts of streambank variations occur including eroding meander cut banks, water willow gravel edge, dolomite boulder talus slope, seeping dolomite ledges, and stabilized forested bank. These variations in **bold black subtitles** below include:

- **Eroding Meander Cut Bank -** Approximately 1,950 linear feet. This streambank type occurs where stream current cuts into an unstable high exposed dirt bank (3-10 feet), especially along treeless pastures, resulting in slumping of soil into generally deep portions of the stream. Vegetation is limited to a few annual wetland species occurring along the eroded edge of the shoreline, and species along the abrupt edge of the exposed embankment. The S1 listed one-flowered flatseed (*Cyperus retroflexus*) was located at the base of an eroded bank.

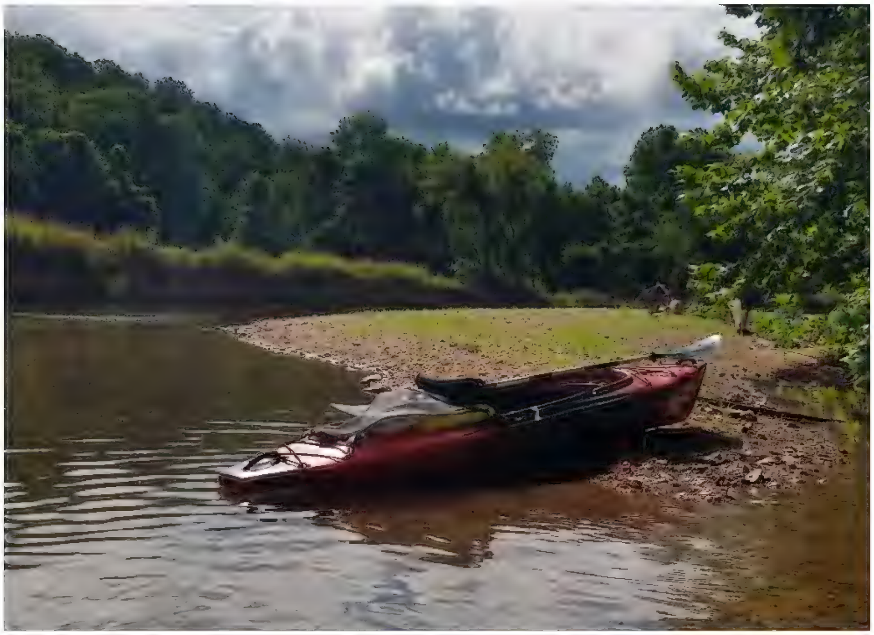

Figure 61. Above, an agricultural field devoid of tree cover rapidly erodes as the stream meander eats away the unprotected soil. Bryant Creek is rapidly cutting the bank and moving left while a gravel point bar is accreting outward from the right. Plants along the top edge of the vertical drop also occur in the field while plants along the sluffed off soil are water-born species including Yerba de Tajo (*Eclipta prostrata*); Obe Wan Conobea (*Leucospora multifida*); Passion flower (*Passiflora incarnata*); Hairy aster (*Symphyotrichum pilosum*); Swamp marigold (*Bidens aristosa*); Floridan lens grass (*Paspalum floridanum*); and Fragrant flatsedge (*Cyperus odoratus*).

- **Water Willow Gravel Edge -** At approximately 1,300 linear feet, this streambank subtype occupies accreted gravel deposits at the edge of gravel bars stabilized by dense zones of water willow (*Justicia americana*). This zone often forms along straight riffle runs. It is the park's only known location for Carpenter's Square (*Schoenoplectus pungens*; C-value 10) as well as:

Water willow	*Justicia americana*
Carpenter's square	*Schoenoplectus pungens*
Cardinal flower	*Lobelia cardinalis*
Prairie dodder	*Cuscuta campestris*
Bald spike rush	*Eleocharis erythropoda*

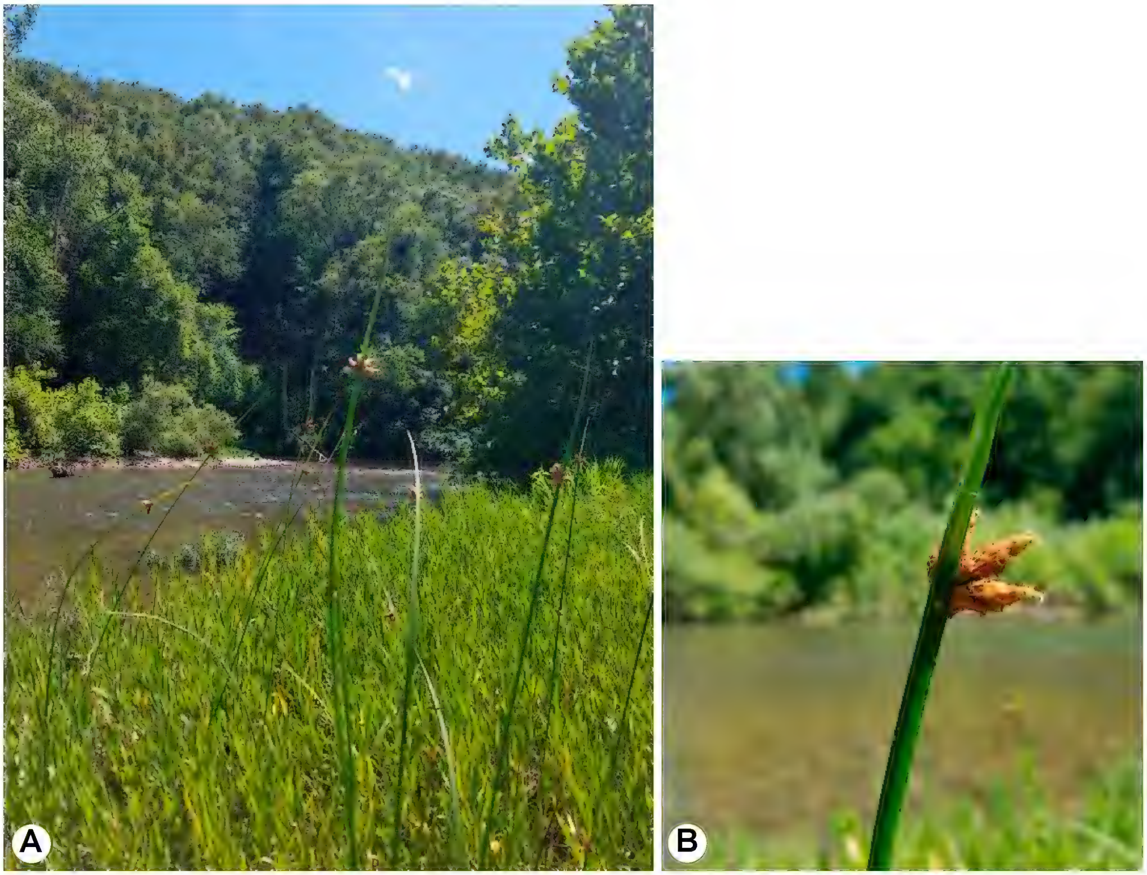

Figure 62. A: The only known population of Chairmaker's Rush (*Schoenoplectus pungens*) growing in the water willow zone along Bryant Creek. Coon Den Bluff is in the background. **B:** Closeup of Chairmaker's Rush spikelets.

- **Dolomite Boulder Talus Bank -** This riverbank variation cpessoni@tnc.orgoccurs where segments of Bryant Creek run collectively one mile along the base of Coon Den and Pearce bluffs. Despite high flood marks along the talus embankment, the talus boulder slope is relatively stable. This streambank zone reaches 8 feet in vertical elevation above the low summer water level. It has strong affinity to the dolomite talus and a narrow zone of mesic dolomite forest above it. The streambank is often forested with a mix of talus slope trees and shrubs, and streambank trees. The only location for Wild Stonecrop (*Sedum ternatum*) occurs on boulders and rocky embankment along the stream. Characteristic flora includes:

Sycamore	*Platanus occidentalis*
Bur oak	*Quercus macrocarpa*

Green ash	*Fraxinus pennsylvanica*
Blue beech	*Carpinus carolinianus*
Bladderpod	*Staphylea trifoliata*
Pawpaw	*Asimina triloba*
Mistflower	*Conoclinum coelestinum*
Side flowering aster	*Symphyotrichum lateriflorum*
Scouring rush	*Equisetum hyemale*
Wild stonecrop	*Sedum ternatum*
Prairie rose	*Rosa setigera*
Sensitive fern	*Onoclea sensibilis*
Great blue lobelia	*Lobelia siphilitica*
Heart-leaved aster	*Symphyotrichum cordifolium*
Tall ironweed	*Vernonia gigantea* subsp. *gigantea*

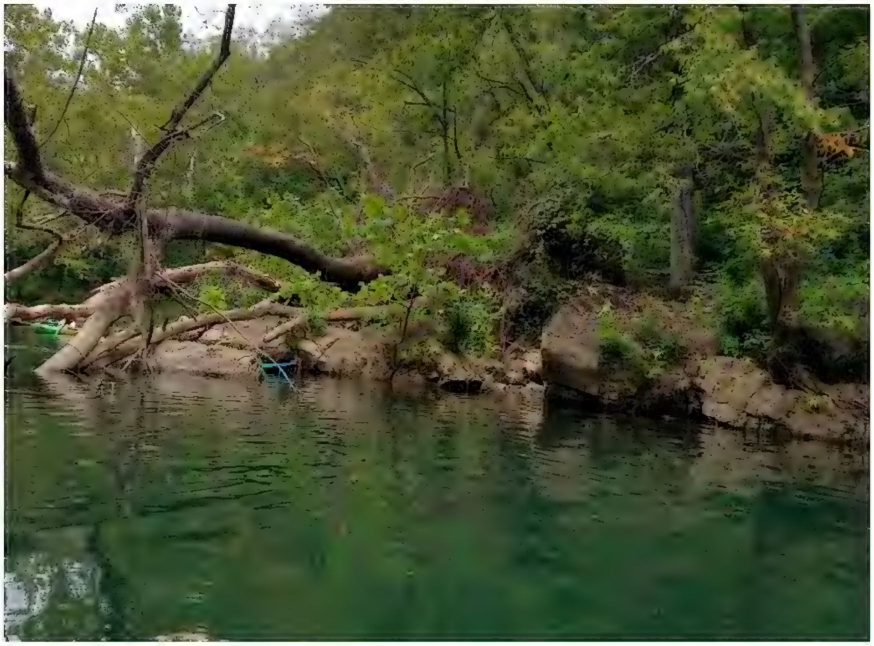

Figure 63. This talus debris forms the north border of the park located directly across from the giant cane-dominated riverfront forest. A mass of dolomite boulders calved from the nearby cliff, exploding in an avalanche that nearly crosses the river at this point.

- **Seeping Dolomite Ledges -** Approximately 1,200 linear feet. Where the floodplain borders steep upland hillslopes, the stream channel often cuts into dolomite bedrock forming unbroken rock ledges along the streambank. Calcareous seepage occasionally exits along the underlying water table along these impervious ledges, here and there intermixed with moist to wet broken and weathered dolostone fragments. Tania (*Lobelia* X *speciosa*) is an unusual but distinctive hybrid between great blue lobelia (*Lobelia siphilitica*) and cardinal flower (*L. cardinalis*) along these ledges.

The following plants often occur along this riverbank variation:

Sensitive fern	*Onoclea sensibilis*
Stalked water horehound	*Lycopus rubellus*
False wood nettle	*Boehmeria cylindrica*
Moneywort	*Lysimachia nummularia*
Great blue lobelia	*Lobelia siphilitica*
Water pimpernel	*Samolus parviflorus*
Winged monkey flower	*Mimulus alatus*
Hidden spikemoss	*Selaginella eclipes*
Cardinal flower	*Lobelia cardinalis*
Riverbank wild rye	*Elymus riparius*

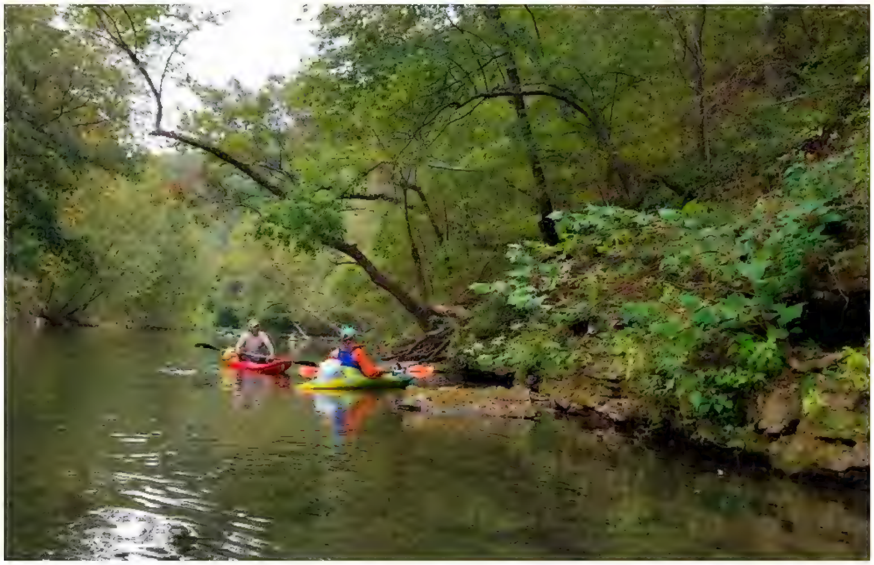

Figure 64. During a September botanical float foray, botanists search the seepy dolomite ledges along the riverbank of Bryant Creek for additions to the park's plant list.

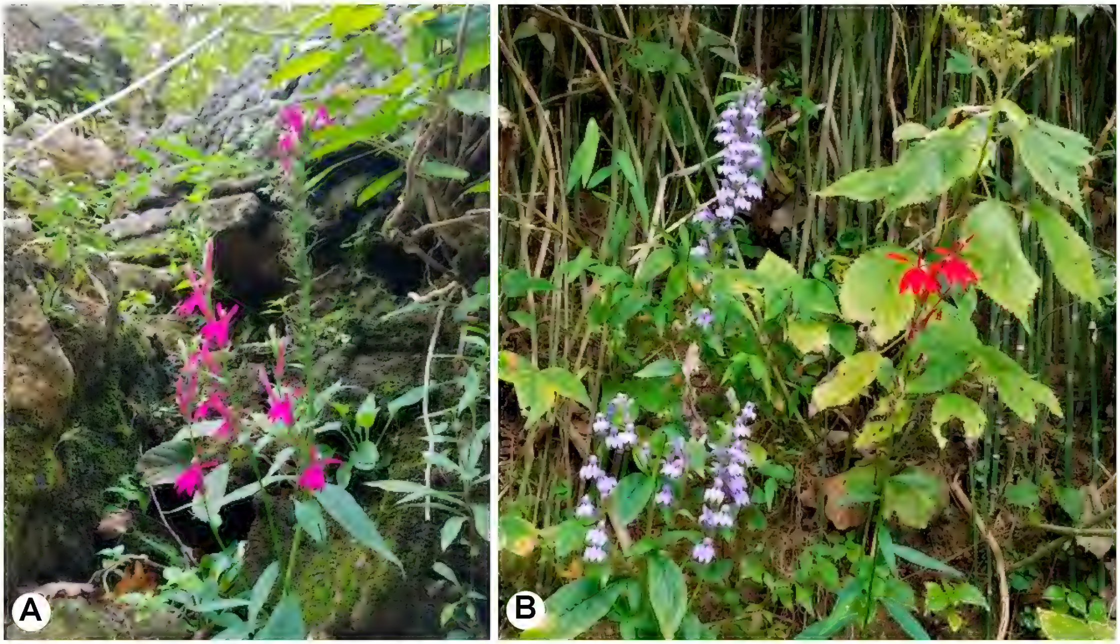

Figure 65. A: Botanists discovered the hybrid known as Tania cardinal flower (*Lobelia* X *speciosa*). The gorgeous amethyst purple flowers are a cross between the two parent plants **B:** cardinal flower (*lobelia cardinalis*) and blue cardinal flower (*Lobelia siphilitica*).

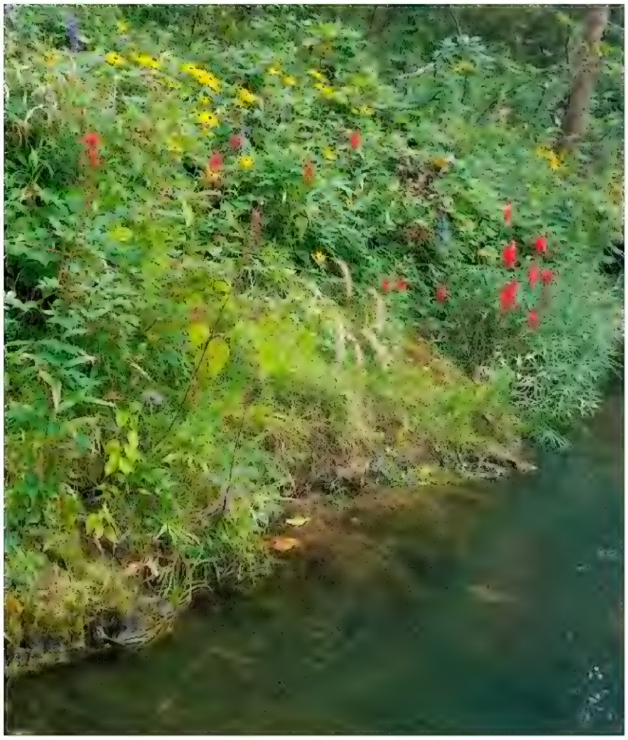

Figure 66. Copious seepage feeds the organically rich mucky soil on dolomite ledges along Bryant Creek. The dolomite bedrock layers extend outward below the water's surface.

- **Stabilized Forested Bank -** Various lengths of streambank totaling nearly 3,500 feet border zones of mature to large old trees along fragmented areas of bottomland forest. These embankments are stabilized by the dense roots of mixed large trees, shrubs, vines, and other herbaceous vegetation. The following plants are common along this zone:

Sycamore	*Platanus occidentalis*
Schneck oak	*Quercus schumardii*
Bur oak	*Quercus macrocarpa*
Buttonbush	*Cephalanthus occidentalis*
Giant cane	*Arundinaria gigantea*
Wood reed grass	*Cinna arundinacea*
Garden phlox	*Phlox paniculata*
Wild golden glow	*Rudbeckia lanceolata*
Scouring rush	*Equisetum hyemale*
Bristly greenbriar	*Smilax hispida*
Raccoon grape	*Ampelopsis cordata*
Wooly pipe-vine	*Isotrema tomentosa*
Spike grass	*Chasmanthium latifolium*
Deer tongue grass	*Dichanthelium clandestinum*
Late goldenrod	*Solidago gigantea*
False nettle	*Boehmeria cylindrica*

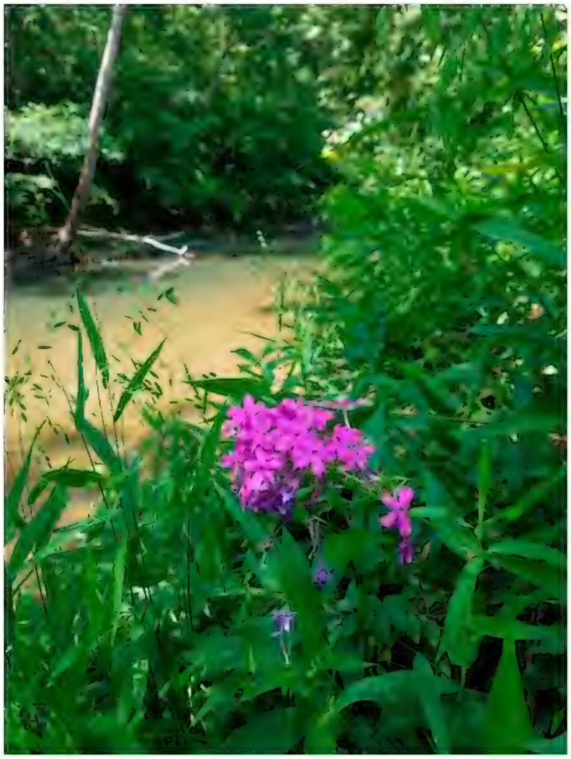

Figure 67. Deep pink panicles of garden phlox (*Phlox paniculata*) are common along forested riverbanks in the Ozarks.

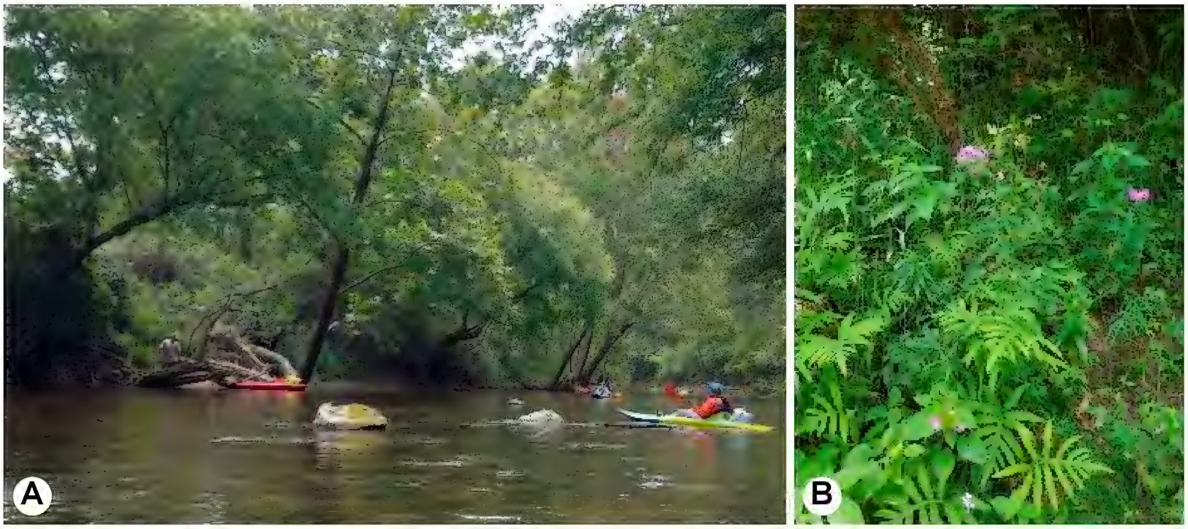

Figure 68. A: Unlike the eroding riverbank, the deep alluvial soil bank on the left is stabilized by the roots of mature bottomland forest trees. The riverbank here is inhabited by a diverse variety of native vines, shrubs, grasses and herbs. **B:** Sensitive fern (*Onoclea sensibilis*), false nettle (*Boehmeria cylindrica*), late goldenrod (*Solidago gigantea*), wild golden glow (*Rudbeckia laciniata*), scouring rush (*Equisetum hyemale*), garden phlox (*Phlox paniculata*), moneywort (*Lysimachia nummularia*), and spike grass (*Chasmanthium latifolium*) are among many conservative plant species noted on this forested riverbank.

Gravel Bar

Extensive deposits of coarse gravel occupy point bars, low islands, abandoned channels, overflow channels, and widened braided channels within the streambed. Sand is an important component associated with gravel bar deposits; more so than other Ozark rivers like the Current, Jack's Fork, Eleven Point, Big, and St. Francois rivers. Unlike these latter rivers, the Roubidoux Formation provides copious quantities of fine-grained sand as Roubidoux sandstone bedrock is eroded throughout the Bryant Creek watershed. As described in Nelson (2010), the gravel bars and sandbars of Bryant Creek are classic Ozark riverine features. Much of their vegetation is both characteristic of and often restricted to this natural community. In addition, Bryant Creek's watershed geographically limits and isolates the development of riparian plant associations, and isolated random plant occurrences. Owing to the often fresh, unvegetated deposition of gravel and sand, many plant species readily pioneer throughout this primary successional habitat. Certain plant species often appear from one growing season to another following frequent, often high-water, floods.

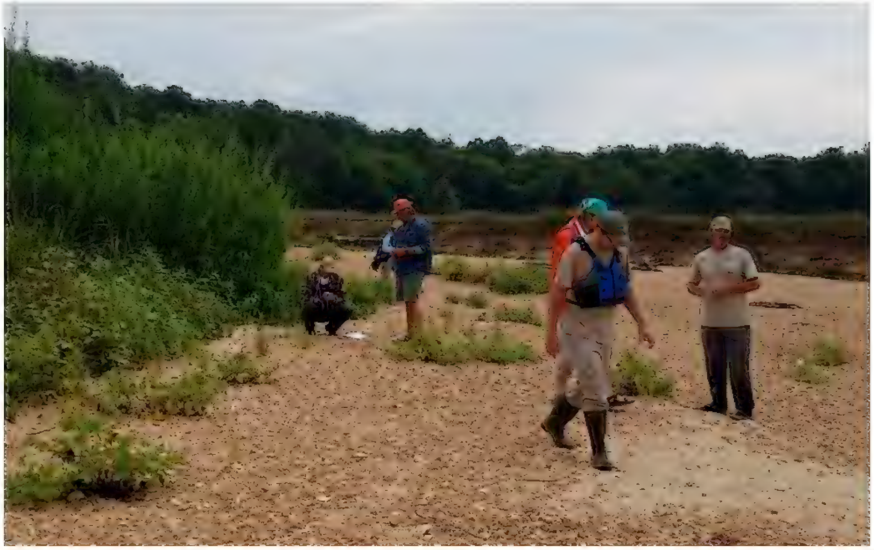

Figure 69. Botanists (see acknowledgements) record plant species on gravel bars along Bryant Creek in September 2020. Left to right, Chris Crabtree, Susan Farrington (background, light blue shirt), Harlee Sherrer (foreground), Justin Thomas (background, orange jacket), Ron Kolatskie (foreground), and Andrew Braun. Plants on the left are cocklebur (*Xanthium strumarium*), and sandbar willow (*Salix interior*).

The following shrubs and vines are characteristic and often confined to the gravel bars of Bryant Creek:

Ward's Willow	*Salix carolina*
Sandbar Willow	*Salix interior*
Ninebark	*Physocarpus opulifolius*
Winter Grape	*Vitis cinerea*
Pale Dogwood	*Cornus amonum obliqua*
Ozark Witchhazel	*Hamamelis vernalis*

Some of the herbaceous species documented on gravel bars include:

Straw-Colored Flatseed	*Cyperus strigosus*
Fragrant Flatseed	*Cyperus odoratus*
Small Morning Glory	*Ipomoea lacunosa*
Hedge Bindweed	*Calystegia sepium*
Thorny Amaranth	*Amaranthus spinosus*
Small Cottonweed	*Froelichia gracilis*
Rough Seeded Clammy Weed	*Polanisia dodecandra*
Mexican Tea	*Chenopodium ambrosioides*
Bouncing Bet	*Saponaria officinalis*
Common Evening Primrose	*Oenothera biennis*
Water Willow	*Justicia americana*
Trailing Wild Bean	*Strophostyles helvola*

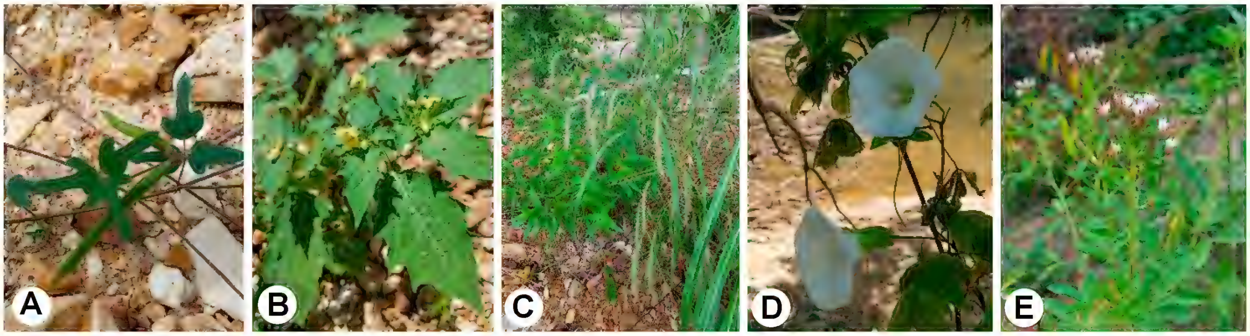

Figure 70. A: Trailing wild bean (*Strophostyles helvola*); **B:** cutleaf ground cherry (*Physalis angulata*); **C:** riverbank wild rye (*Elymus riparius*); **D:** hedge bindweed (*Calystegia sepium*); and **E:** rough-seeded clammy weed (*Polanisia dodecandra*) are frequent on gravel bars along Bryant Creek.

Sandbar

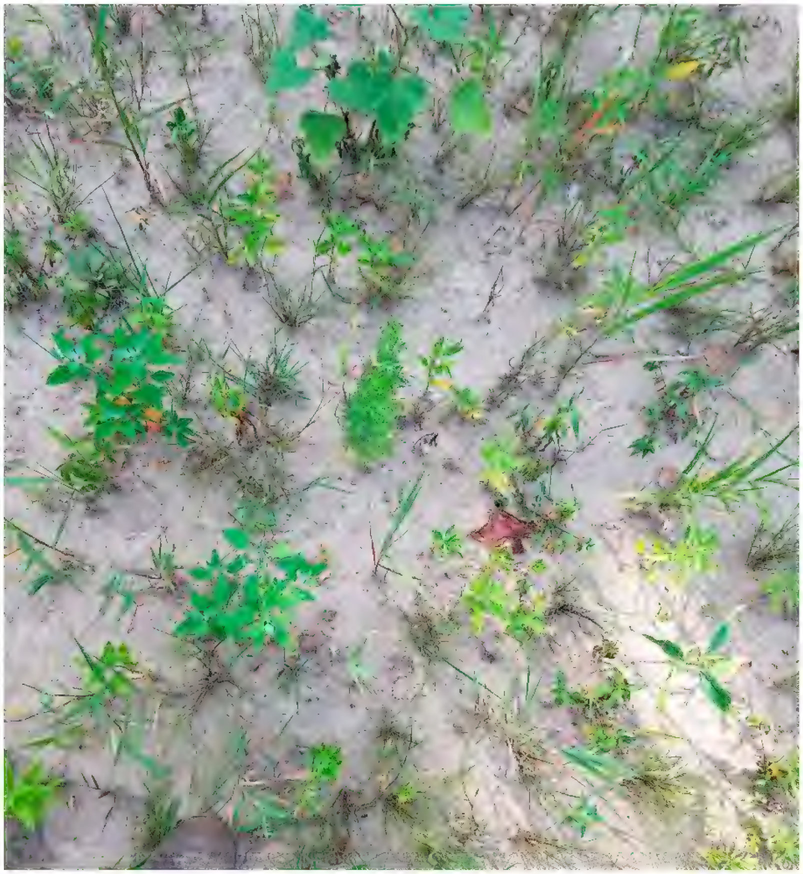

Figure 71. Above, an assortment of plant species is competitively evenly spaced on this sandy depression of a sandbar along Bryant Creek. Recorded species include Mexican tea (*Chenopodium ambrosioides*), lamb's quarters (*C. album*), sweet wormweed (*Artemisia annua*), common evening primrose (*Oenothera biennis*), green foxtail (*Setaria viridis*), little love grass (*Eragrostis minor*), cocklebur (*Xanthium strumarium*), Philadelphia panic grass (*Panicum philadelphicum*), and sand croton (*Croton glandulosus*).

Transport and deposition of small boulders, gravel, and sand are the direct result of stream/river velocity. Fast moving water picks up or scoots gravel along the stream bottom while sand is readily carried by moderate flows anywhere across the floodplain. Sand-sized quartz particles are deposited where high water current slows in velocity. When deposited in large enough quantities sandbars form, often around the back-side curve of accreted point bar meanders, in openings of riverfront forests, behind extensive rows of wood debris, and along elongated narrow zones of shrubs and small trees. Large quantities of sand are also dropped as floodwaters course through trees, canebrakes, and other dense vegetation, especially riverfront forests.

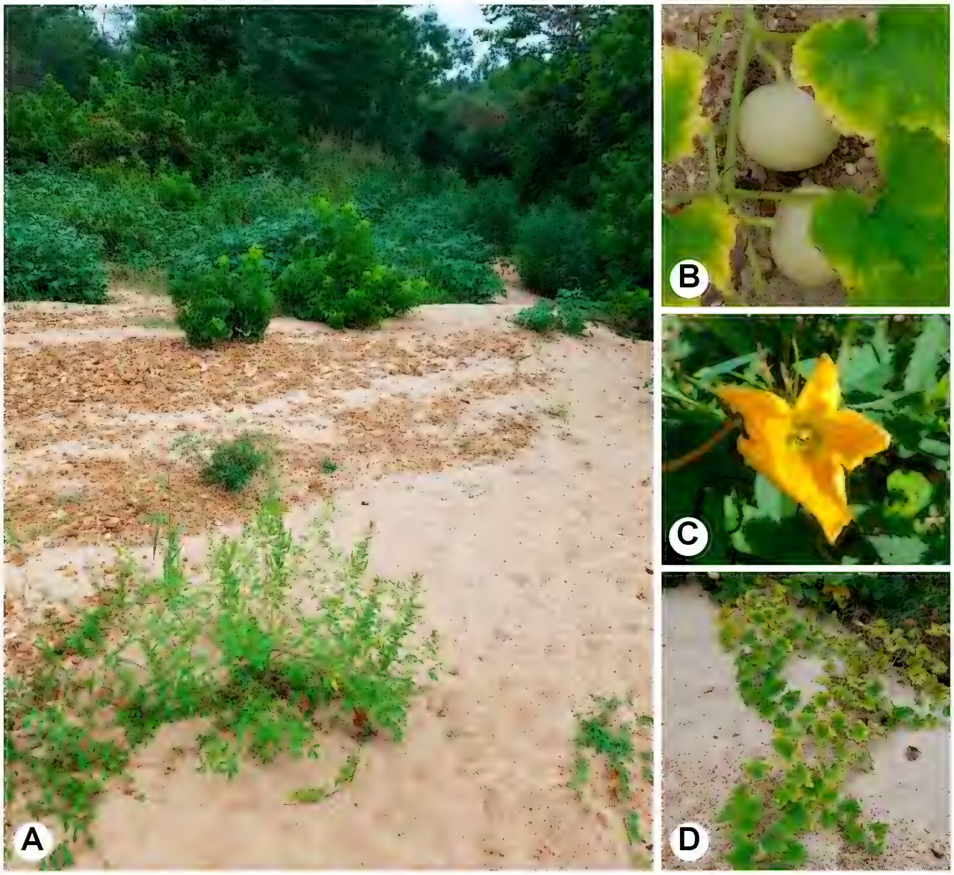

Figure 72. A: A scattering of gravel on a sandbar along Bryant Creek with rough seeded clammy weed in the lower left. **B, C, D:** Three images feature yellow flowered gourd (*Cucurbita pepo var. ozarkana*). It was believed *C. pepo* was domesticated in Mexico and cultivated for its egg-sized fruit by Native Americans at least 10,000 years ago. A more recent hypothesis is that var. *ozarkana* was derived from native ancestors in the southeastern United States (Yatskievych 2006).

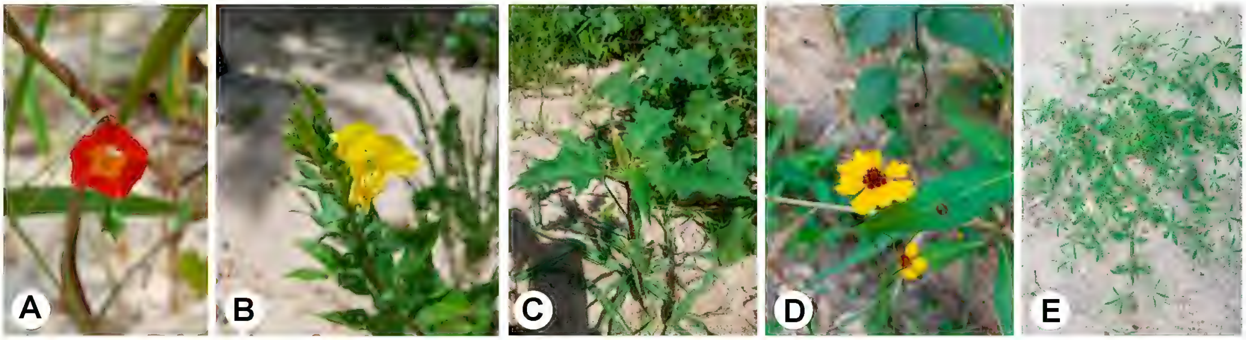

Figure 73. A: scarlet morning glory (*Ipomoea coccinea*); **B:** common evening primrose (*Oenothera biennis*); **C:** Jimson weed (*Datura stramonium*); **D:** golden coreopsis (*Coreopsis tinctoria*); **E:** carpetweed (*Mullugo verticillata*).

Characteristic sandbar species include:

Sandbar Willow	*Salix interior*
Desert Goosefoot	*Chenopodium pratericola*
Groundfig Spurge	*Euphorbia prostrata*
Cutleaf Ground Cherry	*Physalis angulata*
Erect Knotweed	*Polygonum erectum*
Yellow Flowered Gourd	*Cucurbita pepo ozarkana*
Stink Grass	*Eragrostis cilianensis*
Sandbar Love Grass	*Eragrostis frankii*
Creeping Love Grass	*Eragrostis hypnoides*
Sessile Flowered Cress	*Rorippa sessiliflora*
Jimson Weed	*Datura stramonium*
Cocklebur	*Xanthium strumarium*
Carpetweed	*Mullugo verticillata*
Sweet Wormweed	*Artemisia annua*
Sand Croton	*Croton glandulosus*
Golden Coreopsis	*Coreopsis tinctoria*

Mudflat

Fine sand, silt, and organic debris is deposited along the downstream backside of accreted point bars, low deeply scoured cutoff pools in chutes, and old channels silted in by plug bars upon the formation of new chute channels. A good example of a chute cutoff channel occurs on Bryant Creek at the upper end of Coon Den Bluff.

Yerba De Tajo	*Eclipta prostrata*
Marsh Purslane	*Ludwigia palustris*
Ditch Stonecrop	*Penthorum sedoides*
Common Arrowhead	*Sagittaria latifolia*
Common Toothcup	*Ammannia coccinea*

Grand Toothcup	*Ammannia robusta*
Obe-Wan-Conobea	*Lecospora multifida*
Toothcup	*Rotala ramosior*
False Pimpernel	*Lindernia dubia anagallidea*
Peppermint	*Mentha piperita*
Blue Water Speedwell	*Veronica anagallis-aquatica*
Lizards Tail	*Saururus cernuus*
Nodding Bur Marigold	*Bidens cernua*
Emory's Sedge	*Carex emoryi*
Panicled Aster	*Symphyotrichum lanceolatum*
Autumn Sedge	*Fimbristylis autumnalis*
Common Dwarf Rush	*Lipocarpha micrantha*

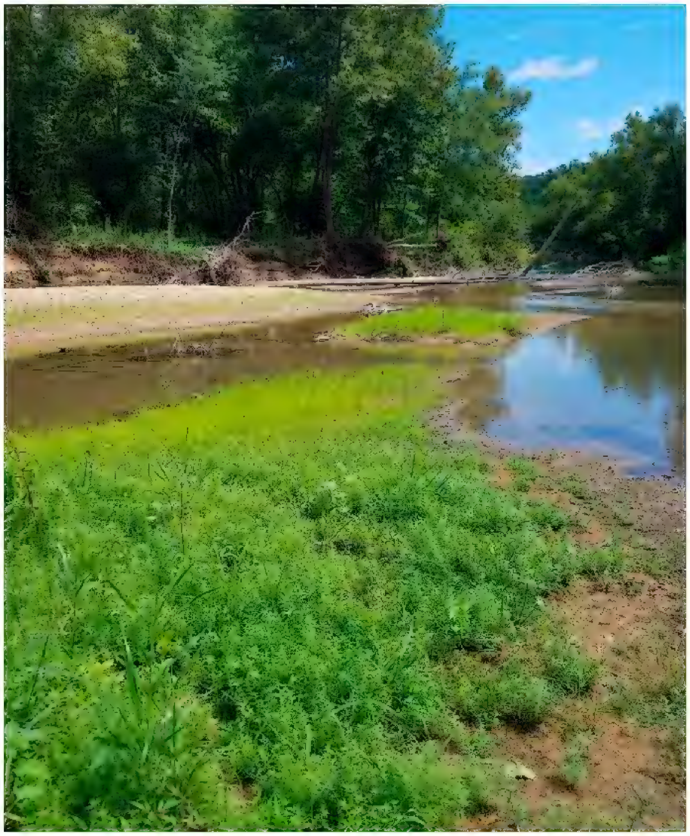

Figure 74. This mudflat extends outward from the downstream leeward side of an extended point between the main channel of Bryant Creek and an overflow slough to the right. Pearce Bluff is along the right side of the stream. Most of the species listed above occur here.

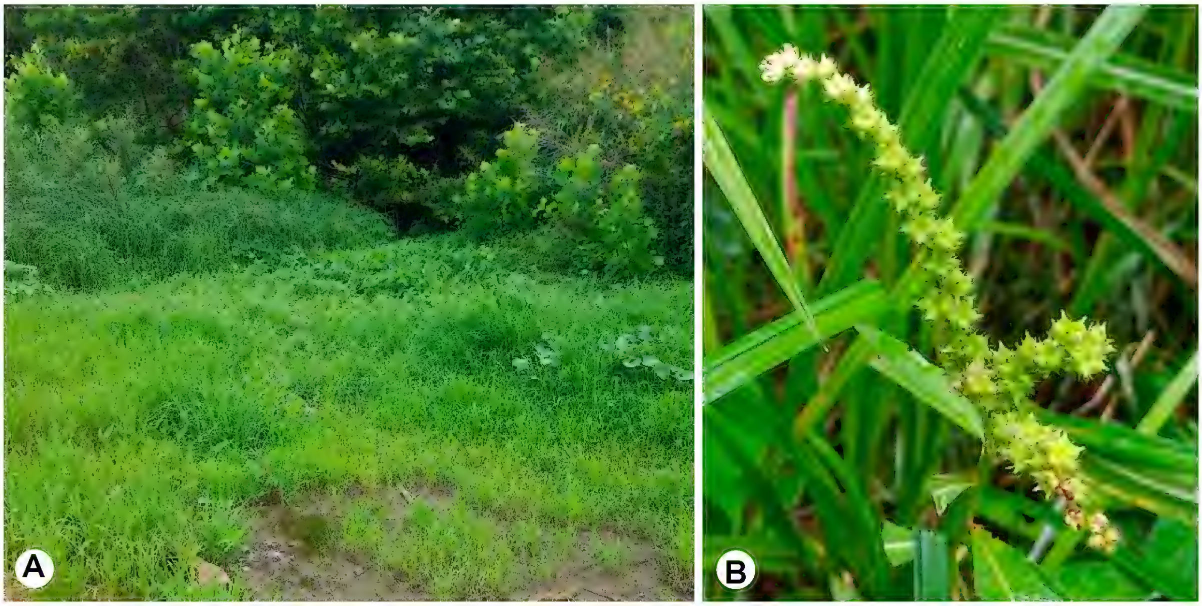

Figure 75. A: Zones of various wetland plants succeed along the mud-filled former channel of Bryant Creek. From the back forward are sycamore (*Platanus occidentalis*), left-sandbar willow (*Salix interior*), Emory's sedge (*Carex emoryi*), cocklebur (*Xanthium strumarium*), common arrowhead (*Sagittaria latifolia*), and rice cut grass (*Leersia oryzoides*). **B:** Ditch stonecrop (*Penthorium sedoides*) is common in this setting.

Cut off Stream Channel Slough *(Former Bryant Creek Channel)*

Plant species observed in sloughs include:

Common Cattail	*Typha latifolia*
Panicled Aster	*Symphyotrichum lanceolatum*
Ozark Spatterdock	*Nuphar advena* subsp. *ozarkana*
Large Flowered Water Plantain	*Alisma trivale*
Engelmanns Arrowhead	*Sagittaria brevirostra*
Leafy Pondweed	*Potamogeton foliosus*
Water Willow	*Justicia americana*

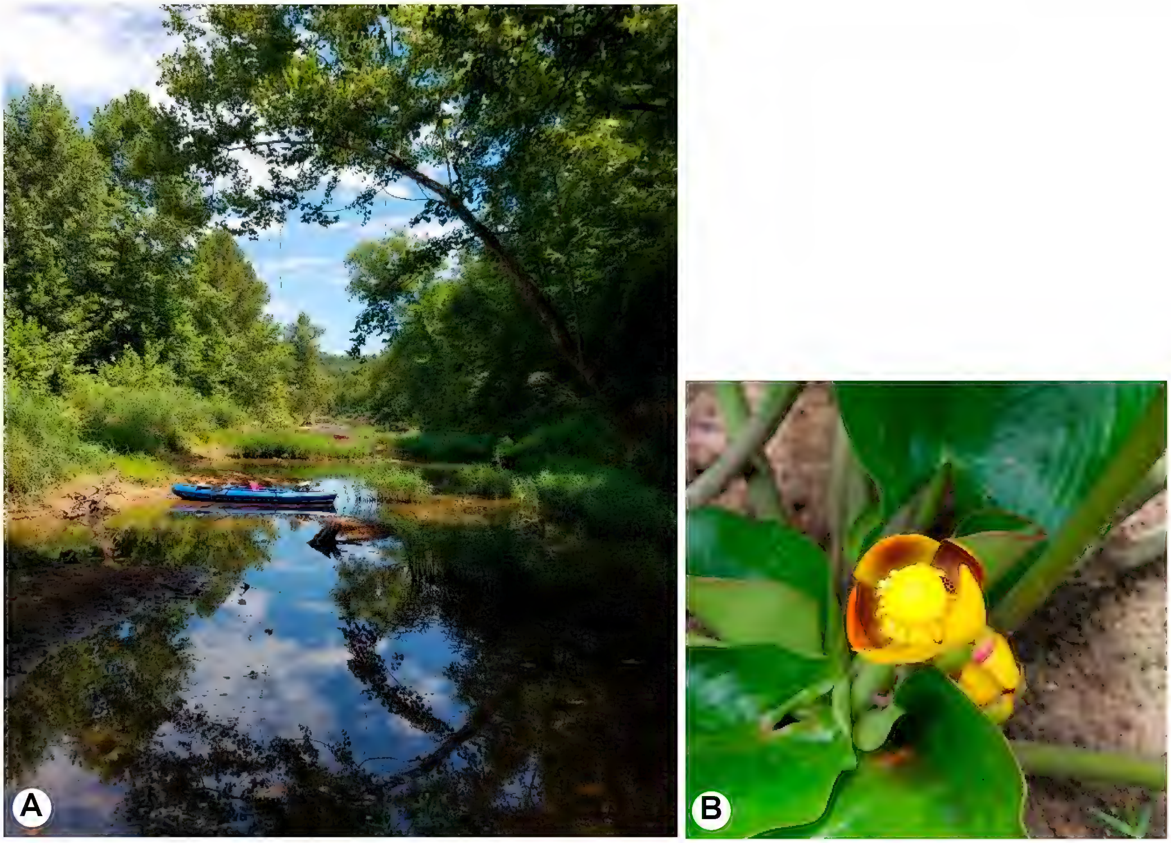

Figure 76. A: An overflow chute across the floodplain becomes stagnant during typical low water flows of Bryant Creek during the late summer. **B:** Ozark spatterdock (*Nuphar advena* subsp. *ozarkana*) is common in most sloughs.

Streambank

In contrast to the Bryant Creek stream edge variations that are more riverlike in character, the streambank natural community best fits the smaller tributary drainages of the park. Streambanks better capture gaining stream characteristics, and flora while the losing stream portions fall into the dry-mesic bottomland woodlands and gravel washes. Gaining streams occur in the upper portions of Pike, Major, West, Shiloh, and a few branches of Central hollows. As described in the mesic sandstone forest and spicebush terrace seep descriptions, gaining streams occur where headwaters in steep narrow valleys cut into and intercept the impervious underlying sandstone base rock. These many streams carve into the erosion-resistant sandstone layers creating a wide variety of cascades, some which provide moist to wet niches for cryptogams and vascular flora.

The following images best exemplify characteristics of these gaining headwater streambanks.

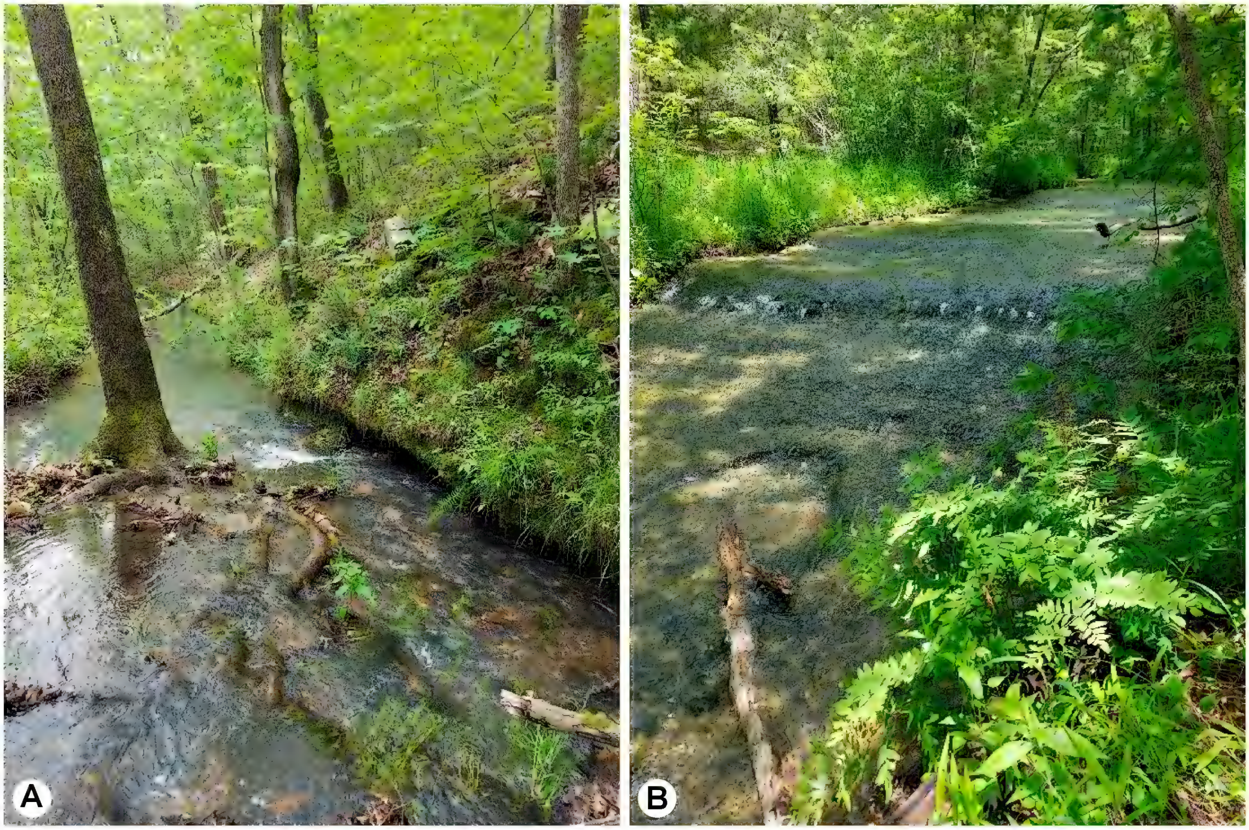

Figure 77. Precipitation and acid seeps feed this gaining stream in the valley west of the main dolomite glade. Both image locations are in the extreme northeast corner of Section 35. **A:** The stream undercuts a sandstone layer adorned in mosses, ferns, and herbaceous flora. **B:** Several hundred yards downstream, waters flow over layers of solid sandstone pavement, which extends outward beneath a muck soil covered in acid seep sedges, wildflowers, and ferns. It is the park's only known location for royal fern (lower right) (*Osmunda regalis*) discovered by Chris Crabtree. Prairie straw sedge (*Carex suberecta*) and Grass-of-Parnassus (*Parnassia grandifolia*) occur only along the streambank on the left bank of the stream.

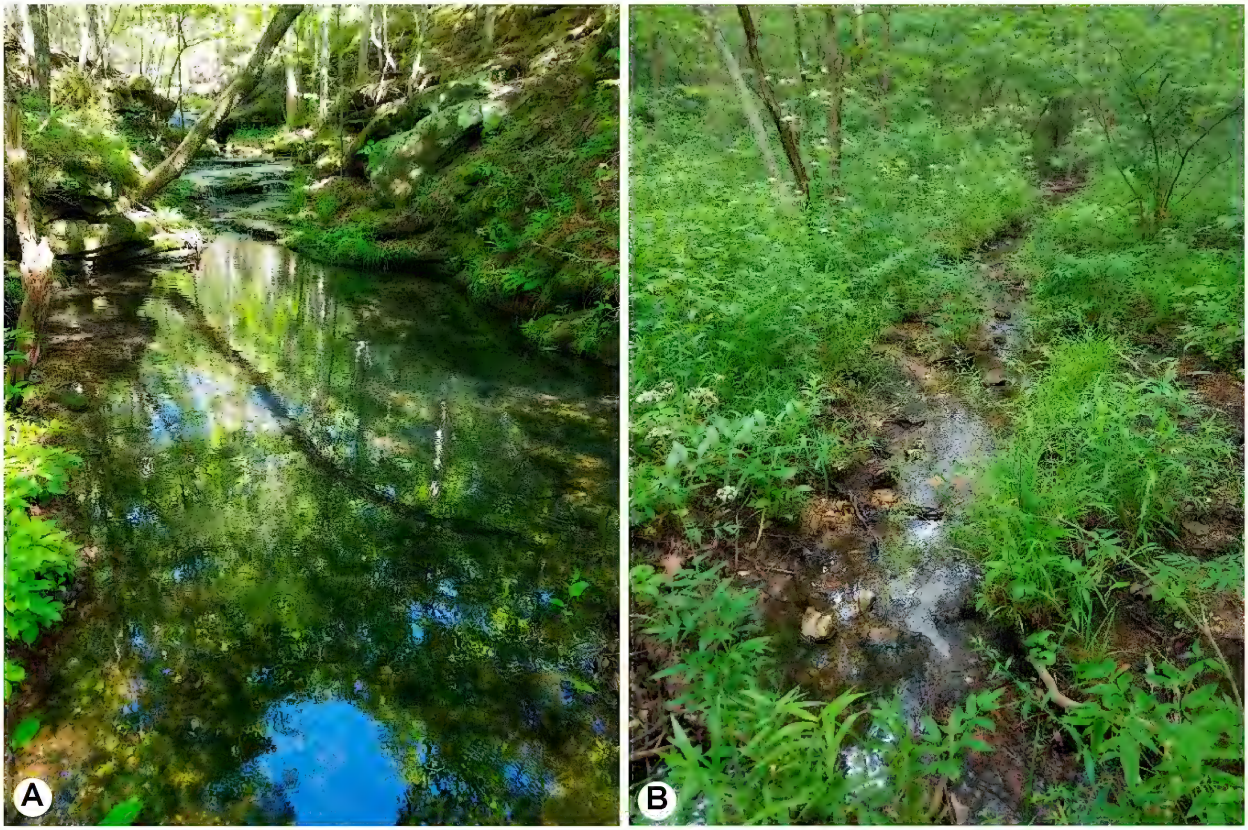

Figure 78. A: A dolomite spring ½ mile upstream (near the main dolomite glade) supplies permanent water into this sandstone canyon. **B:** Acid seepage feeds this stream in West Hollow; the upstream portion of Boiler Hollow. Note the water hemlock (*Cicuta maculata*) along its banks.

Dry-Mesic Bottomland Woodland

This natural community is included here to contrast natural communities associated with the permanent flowing waters of Bryant Creek. Dry-mesic bottomlands occur primarily along the main drainages known as Shiloh and Central hollows south of Highway N. Both drainages are subject to high precipitation flash floods that move coarse gravel and boulders throughout the floodplain. However, unlike Bryant Creek and the deep hollow drainages north of Highway N, these rock-strewn bottomlands are rapidly drained with poorly defined channels, leaving little surface water throughout the year. Soils are well to somewhat excessively drained. While the riparian areas of Bryant Creek generally contain many plant species adapted to wetter areas, species found in dry-mesic bottomlands also occur in upland dry-mesic conditions. The distinction between forest and woodland is determined by whether fire effects are strong enough to shape fire-mediated vegetation patterns and groundcover. In general, forests along Central Hollow occupy the more protected fire-shadow terraces along north- and east-facing steep hillslopes or occur where gravel wash scours minimize fire effects. Small, restricted zones of dry-mesic bottomland forest occur along the lower losing stream sections of Pike, Major, and Turkey Flat hollows.

Dominant trees in this nearly one mile long Central Hollow bottomland include white oak (*Quercus alba*), chinquapin oak (*Q. muehlenbergii*), post oak (*Q. stellata*), mockernut hickory (*Carya tomentosa*), sugar maple (*Acer saccharum*), sycamore (*Platanus occidentalis*), and black locust (*Robinia pseudoacacia*). Scattered understory trees are flowering dogwood (*Cornus florida*), deciduous holly (*Ilex decidua*), elderberry (*Sambucus canadensis*), and cockspur hawthorn (*Crataegus crus-galli*).

Spike grass (*Chasmanthium latifolium*), rock satin grass (*Muhlenbergia solbolifera*), grass sedge (*Carex jamesii*), white vervain (*Verbena urticifolia*), bare-stemmed tick trefoil (*Hylodesmum nudiflorum*), common spiderwort (*Tradescantia ohiense*), lousewort (*Pedicularis canadensis*), tall bellflower (*Campanula americana*), and late figwort (*Scrophularia marilandica*) are abundant along with scatterings of Maryland senna (*Senna marilandica*), pale Indian plantain (*Arnoglossum atriplicifolium*), lyre-leaved sage (*Salvia lyrata*), and downy skullcap (*Scutellaria incana*).

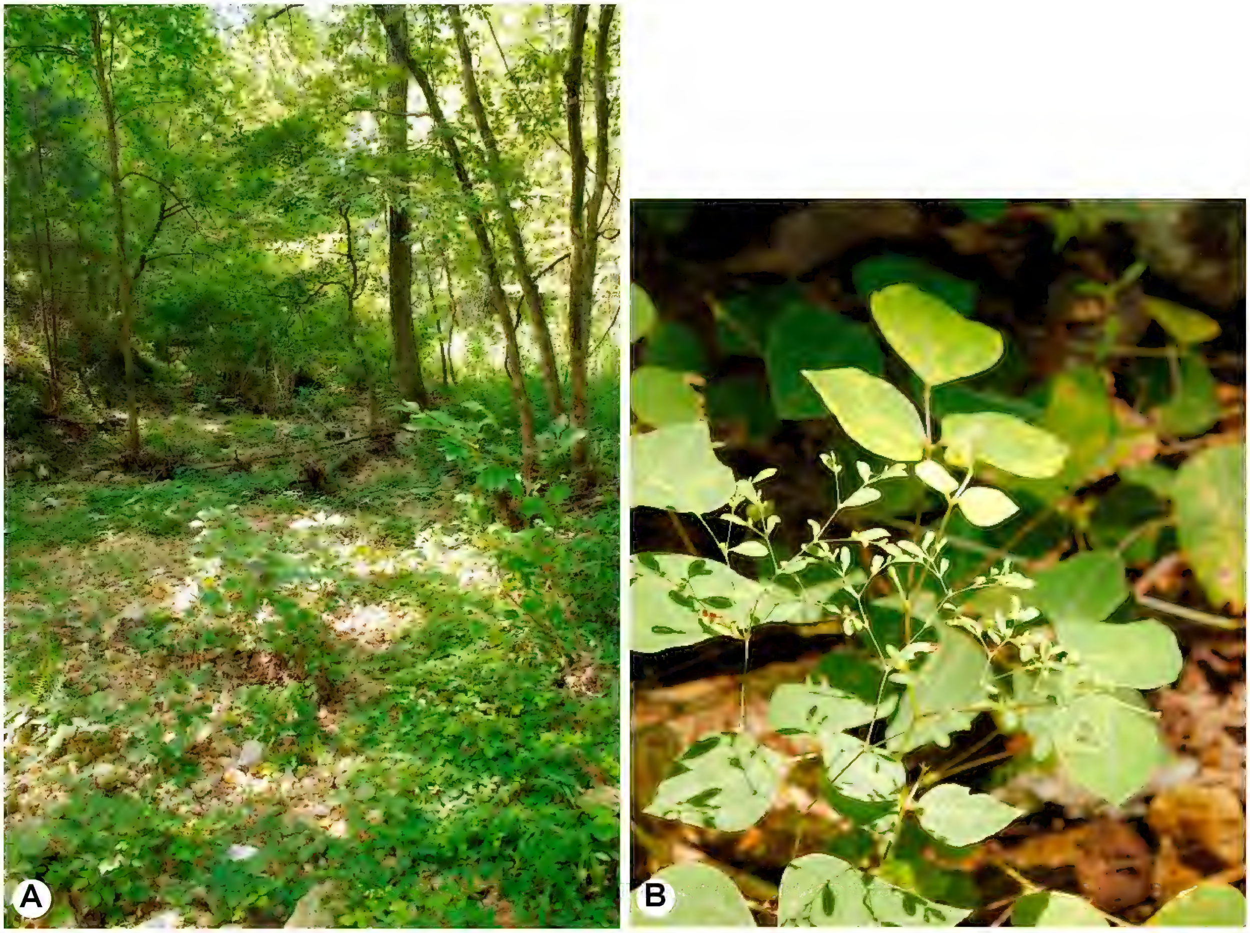

Figure 79. A: Image in lower Central Hollow shows evidence of frequent flash floods but with no well-defined stream channel in this 200 to 500-foot-wide bottomland. **B:** This is the only known location for tall forked chickweed (*Paronychia canadensis*).

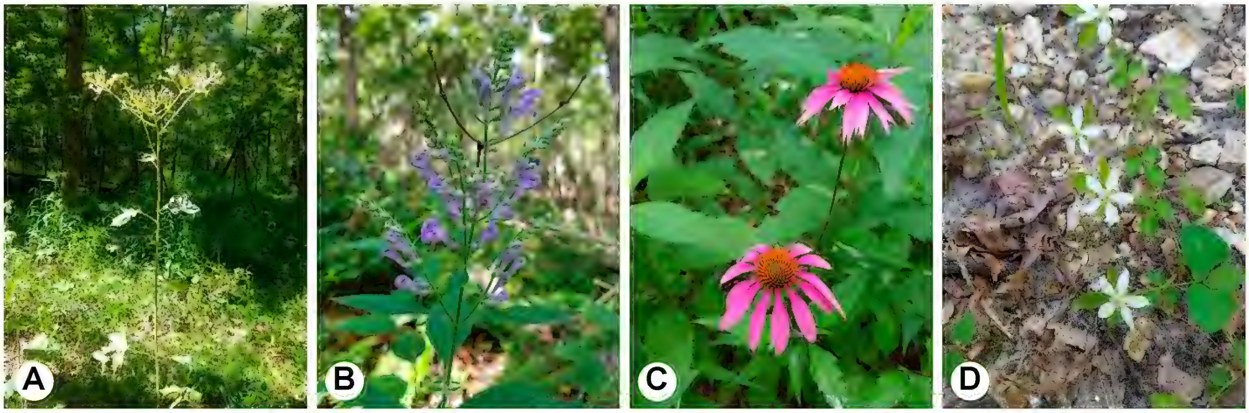

Figure 80. Abundant in dry-mesic bottomland woodland are **A:** pale Indian plantain (*Arnoglossum atriplicifolium*); **B:** downy skullcap (*Scutellaria incana*); **C:** purple coneflower (*Echinacea purpurea*); and **D:** one-flowered dewberry (*Rubus enslenii*).

Gravel Wash

Nearly all the gravel wash natural communities in the park are of the blue beech (*Carpinus caroliana*), ninebark (*Physocarpus opulifolius*), Vernal witch hazel (*Hamamelis vernalis*) subtype (Nelson 2010) typical of dry losing streams and drainages in headwater valleys and ravines. Good examples of this subtype occupy the moderate gradient mid to lower drainages of Central Hollow, and portions of losing stream segments of the deeper hollows north of Highway N. This variable subtype includes the course outwash gravel, stones, and large boulders (up to 3 feet in diameter) in steep eroded ravine drainages descending into lower gradient valleys. Flash floods transport large amounts of gravel and boulders into valleys where it is deposited as fanning alluvium as the waterway widens.

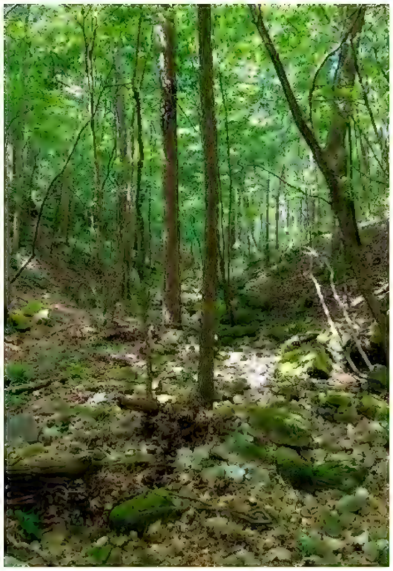

Figure 81. These dry gravel and boulder-strewn washes often harbor plant species found in the adjacent dry-mesic upland and bottomland woodlands.

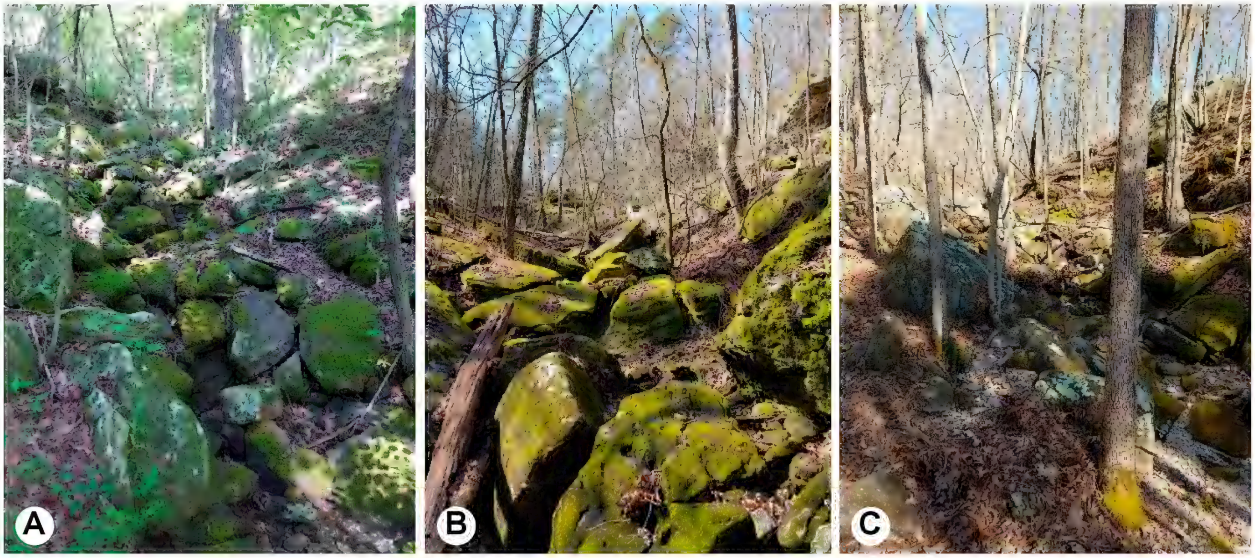

Figure 82. A, B, C: Many of the park's small side hollows originate as boulder-strewn draws perched high off the edge of ridges and flats. Heavy rains scour these drains, leaving huge sandstone boulders. Eventually, as they descend into deeper ravines and valleys, large boulders give way to gravel washes and gaining streams.

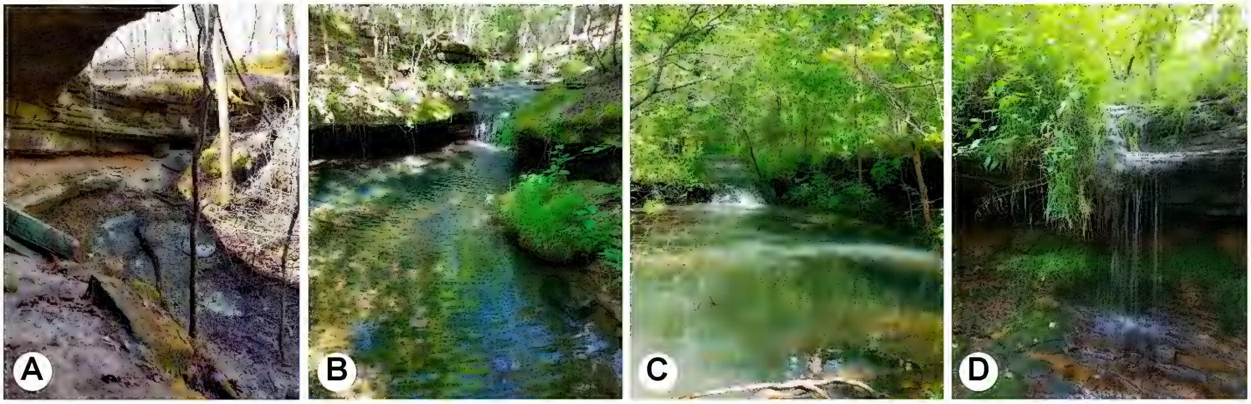

Figure 83. A, B, C, D: Dozens of small waterfalls and pour-overs occur in the park. The moist to wet ledges, overhangs, recesses, seeps, and pools associated with them have affinities to the seeps, springs, streambanks, and moist cliffs/ledges described herein. The images document a few of the many visited by the author.

Cultural Flora

This category refers to the presence of plant species resulting from the destabilization or destruction of natural communities to build structures, highways, pastures, yards, logging roads, artificial ponds, etc. Human activities also include agricultural practices and landscaping. These cultural effects often facilitate introductions of exotic invasive plant species.

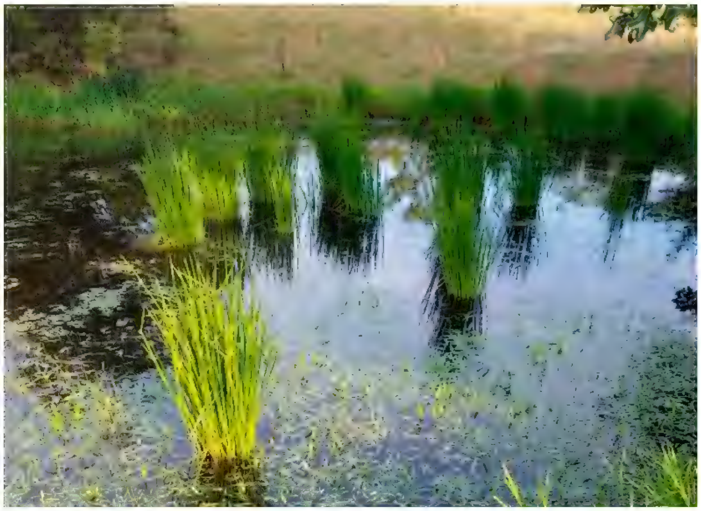

Figure 84. One of five artificial ponds built for livestock watering and aesthetics.

The cultural features in Bryant Creek State Park include Simpson Pasture, paved Highway N right-of-way (ROW), county gravel roads, miles of old logging roads (many becoming overgrown), approximately 25 log landings, powerline right-of-way, and five artificial ponds. Noteworthy occurrences of potential problematic exotics include sericea lespedeza (*Lespedeza cuneata*) that occurs sporadically in Simpson Pasture and log landings south of Highway N. Reed canary grass (*Phalaris arundinacea*) is prevalent in moist depressions of silted slackwaters of Bryant Creek. Bog Bulrush (*Schoenoplectus mucronatus*) that occurs in many ponds at Shepherd of the Hills State Park likewise occurs in 3 ponds (tall clumps in pond above) at Bryant Creek State Park.

Chameleon plant (*Hottuynia cordata*) appears on the Global Invasive Species List because it is a huge risk to native habitats. Sought as an ornamental, the plant rapidly spreads through difficult to remove rhizomes. A web search of this species as a rapidly spreading garden plant should suffice to alarm ecologists: https://awaytogarden.com/why-wont-this-plant-die/. Dozens of plants occur in front of the house near the carport where it is spreading into the lawn.

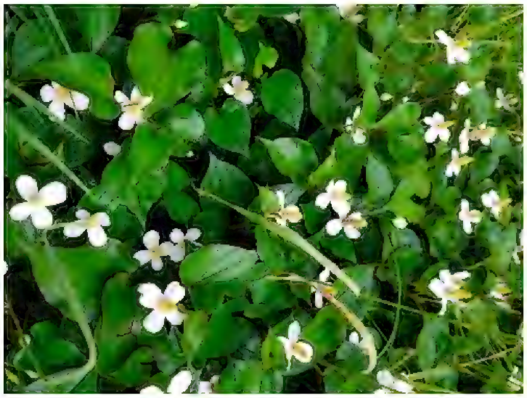

Figure 85. Chamelion plant (*Hottuynia cordata*) is present near the carport.

CULTURAL HABITATS

Abandoned Upland Pasture

Simpson Pasture behind the house and stable barn is the primary habitat for a host of typical cool season grasses including tall fescue (*Festuca arundinacea*), timothy (*Phleum pratense*), smooth brome (*Bromus inernis*), orchard grass (*Dactylis glomerata*), Kentucky Bluegrass (*Poa pretensis*), and tickle grass (*Agrostis hyemalis*). Species found only in the pasture include Adam's needle (*Yucca smalliana*), Deptford pink (*Dianthus armeria*), heavy sedge (*Carex gravida*), common bugle (*Ajuga reptans*), soft chess (*Bromus hordeaceus*), mouse-tail fescue (*Vulpia myuros*), and field sorrel (*Rumex acetosella*). Scattered throughout the pasture, Sericea lespedeza (*Lespedeza cuneata*) and musk thistle (*Carduus nutans*) are noxious weeds in parts of Missouri.

Rights-of-way for Maintained Paved and Gravel Roads, and Utility Lines

Whether paved or gravel, margins of frequently traveled roadways are quite productive for finding native species otherwise suppressed by extensively shaded adjacent dense woodlands. Likewise, the nearly 100 percent herbaceous native cover of sunlit open powerline utility corridors often concentrate herbaceous ground flora associated with dry open chert and sandstone woodlands. A few of the many species found exclusively along maintained roads and utility corridors include thread-leaved sundrops (*Oenothera linifolia*), common pepper grass (*Lepidium virginicum*), hairy phacelia (*Phacelia hirsuta*), moth mullein (*Verbascum blattaria*), white clover (*Melilotus albus*), Illinois bundle flower (*Desmanthus illinoensis*), shining bluestar (*Amsonia illustris*), biennial gaura (*Oenothera filiformis*), yellow-flowered leafcup (*Smallanthus uvedalius*), Sulphur cinquefoil (*Potentilla recta*), and rosinweed (*Silphium integrifolium*).

Used and Abandoned Logging Roads and Log Landings

Heavy logging that occurred from 2003-2008 south of Highway N left its mark in the form of extensive logging roads, at least 25 log landings, and soil damage caused by logging activities. Initially, this logging activity opened dense second growth woodlands to increased sunlight beneficial for increasing groundcover density and diversity. Past wildfires and a prescribed burn have further stimulated the recovery of characteristic woodland herbaceous plant life. However, lack of managing the ever-increasing brush and dense tree saplings is beginning to suppress the recovery of woodland herbaceous species. Oddly, several conservative and sensitive species have appeared in ephemeral water-filled deep mud ruts along old logging roads, especially on upland flatwoods. This suggests the propagules for these species might be present across level upland clayey soils in flatwoods that are susceptible to ponding during heavy rains. Most of these locations occur in dense second growth pine stands that might benefit from moderate thinning. These species are discussed under the upland flatwoods natural community.

Impacts from logging activities have also facilitated increases in weedy plant species including poison hemlock (*Conium maculatum*), pokeweed (*Phytolacca americana*), tall fescue

(*Festuca arundinacea*), smooth sumac (*Rhus glabra*), and black raspberry (*Rubus occidentalis*), as well as several introduced grasses along logging roads, including sweet vernal grass (*Anthoxylum odoratum*), weeping love grass (*Eragrostis curvula*) and Caucasian bluestem (*Bothriochloa bladhii*).

Five artificial ponds are scattered across the park, hosting numerous aquatic and pond margin wetland plant species likely introduced over several decades from waterfowl, wind, livestock and humans. As with Shepherd of the Hills State Park (Nelson 2019), bog bulrush (*Schoenoplectus mucronatus*) is an aggressive invasive wetland species here, occurring in three of the ponds.

Planted Flora in the Yard

While including trees, shrubs, and herbs planted in yards and other areas is atypical for floristic inventories, such species are a major source for the unplanned and accidental spread of numerous exotic or non-native species. For example, silver maple (Acer saccharinum) is planted in the yard. Its seedlings can spread into Bryant Creek floodplain where this species does not occur naturally. Chameleon plant (*Hottuynia cordata*), discussed previously, was originally planted in front of the residence and has spread into the adjacent lawn.

ANALYSIS OF THE FLORA

Of the 940 taxa identified in Bryant Creek State Park, 803 (85 percent) are native. The flora includes representatives of four major vascular plant groups: Pteridophytes (34 taxa), Gymnosperms (4 taxa), Angiosperms (262 monocots and 640 dicots [eudicots and basal angiosperms]). These occur in 116 families and 359 genera. Families with the largest number of species are the Asteraceae (131), Poaceae (121), Cyperaceae (70), and Fabaceae (56), collectively totaling 379 species or 40 percent of the total observed flora. The largest genera are *Carex* (43 species), *Dichanthelium* (20), *Solidago* (14), *Symphyotrichum* (14), *Desmodium* (10), *Juncus* (10), *Eragrostis* (9), and *Ranunculus* (9). Several species are abundant and well-distributed across the park. These include white oak (*Quercus alba*), shortleaf pine (*Pinus echinata*), sassafras (*Sassafras albidum*), hog peanut (*Amphicarpaea bracteata*), dittany (*Cunila origanoides*), silky bush clover (*Lespedeza cuneata*), late low blueberry (*Vaccineum pallidum*), bare-stemmed tick trefoil (*Hylodesmum nudiflorum*), Christmas fern (*Polystichum acrostichoides*), lyre-leaved sage (*Salvia lyrata*), and old field goldenrod (*Solidago nemoralis*).

As shown in **Table 5**, the flora includes 13 Missouri species of conservation concern (MDC 2022). Seven are not recorded from any other Missouri state park: gaping panic grass (*Steinchisma hians*), showy lady slipper orchid (*Cypripedium reginae*), lobed spleenwort (*Asplenium pinnatifidum*), hirsute lettuce (*Lactuca hirsuta*), cliff fern (*Woodsia obtusa* subsp. *occidentalis*), large-seeded mercury (*Acalypha deamii*), Ozark spiderwort (*Tradescantia ozarkana*), prickly bog sedge (*Carex atlantica* var. *atlantica*), crane fly orchid (*Tipularia discolor*), pink smartweed (*Persicaria bicornis*), and one-flowered flatseed (*Cyperus retroflexus*).

Table 5. Missouri Species of Conservation Concern in Bryant Creek State Park

Scientific Name	Common Name	State Rank	Population Size
Acalypha deamii	Large Seeded Mercury	S1	2 plants
Asplenium pinnatifidum	Lobed Spleenwort	SU	145 plants
Carex atlantica* subsp. *atlantica	Prickly Bog Sedge	S1	3 clumps
Cyperus retroflexus	One-Flowered Flatseed	S1	2 plants
Cypripedium reginae	Showy Lady Slipper Orchid	S2S3	7 plants
Lactuca hirsute	Hairy Lettuce	SU	8 plants (scattered)
Micranthes palmeri	Palmer's Saxifrage	S1	Several hundred
Persicaria bicornis	Pink Smartweed	SU	3-8 plants
Steinchisma hians	Gaping Panic Grass	S3	Several hundred
Tipularia discolor	Crane Fly Orchid	S3	4 plants (scattered)
Tradescantia ozarkana	Ozark Spiderwort	S2	8 plants
Viburnum molle	Arrow-Wood	SU	<10 small shrubs
Woodsia obtusa* subsp. *occidentalis	Cliff Fern	S1	5 plants

Resource scientists within the Missouri State Park system have adopted the Floristic Quality Assessment (FQI) as a means of monitoring and assessing the natural integrity and recovery/restoration of state park natural landscapes. Ladd & Thomas (2015) enumerate on the discipline of the FQI approach that forms the primary framework of the park system's vegetative monitoring program. When comparing to the C-value distribution table on page 14 of Ladd & Thomas, the numbers of taxa assigned each C-value for Bryant Creek (**Figure 86**) closely parallel the relative percentages in each assigned value for the Missouri Flora. This comparison suggests that the park's flora contains a relatively moderate to high number of conservative (and restorable) taxa, and good quality native index when considering the distribution and abundance of each taxa throughout the park. However, many of these conservative taxa occur in isolated occurrences and low numbers at the park.

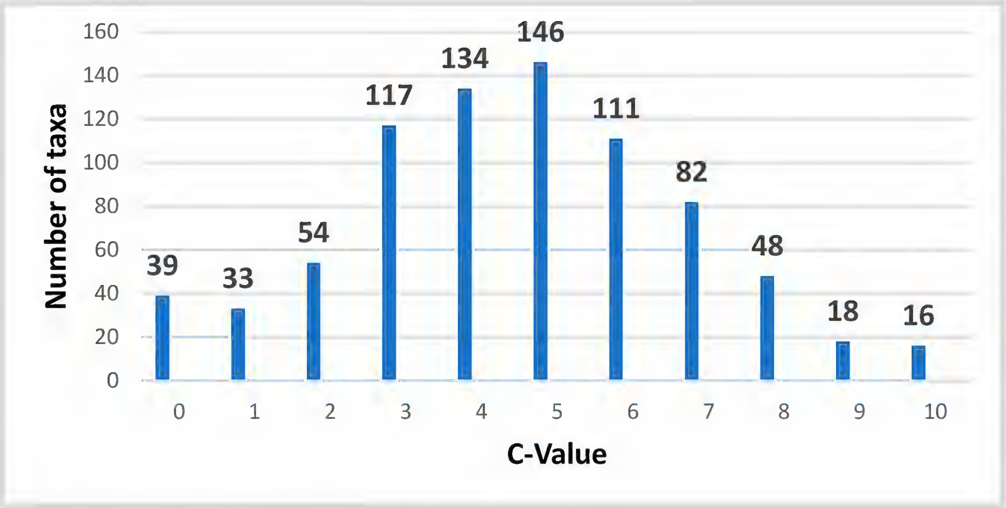

Figure 86. C-Value distribution for Byrant Creek State Park.

DISCUSSION

Many high C-value conservative plant species occurred in local, isolated locations, often discovered during random traversals. I believe there is a high probability other conservative taxa will be discovered at the site, especially as restoration activities progress. Active and immediate ecological restoration on a large scale is critical for stimulating and increasing otherwise isolated and conservative plant species, and for mitigating impacts of extensive browsing by white-tailed deer observed in the park.

When the list of native taxa in Bryant Creek State Park (**Figure 87**) is compared to the "wetness distribution" of Missouri Flora (Ladd & Thomas 2015, Figure 1), the analysis supports a flora with drier affinities. This is expected for the Ozark Highlands in general, since a disproportionate number of wetland obligate species occur in northern and southeastern Missouri. While nearly 50 percent of Missouri's flora is rated facultative or wetter, in contrast, the flora of Bryant Creek is rated 36 percent, leaving 64 percent adapted to drier uplands. This distribution is likely the norm for this portion of the Ozarks.

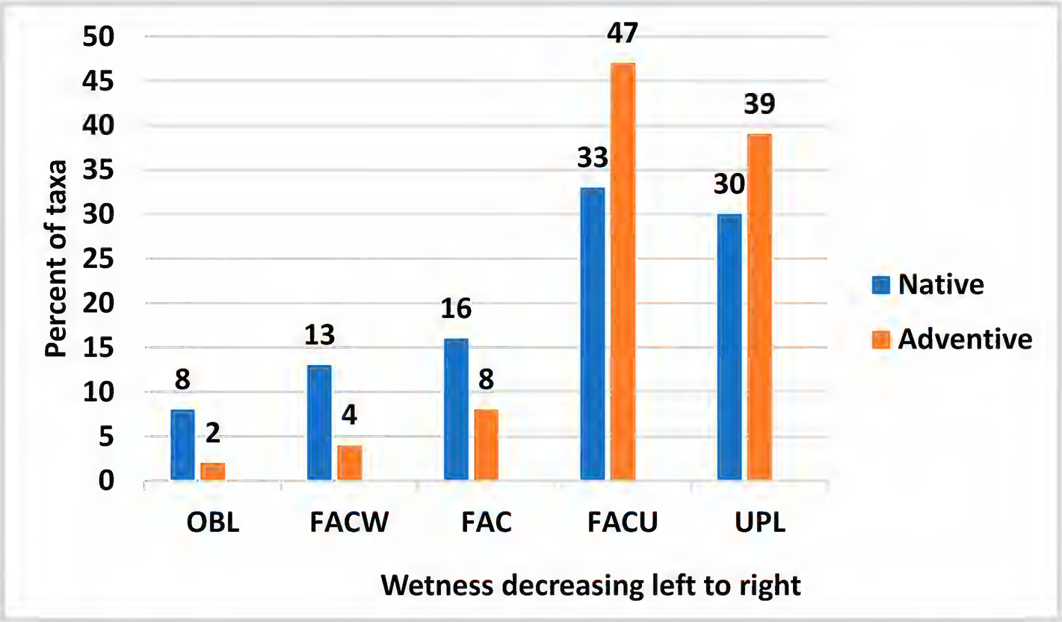

Figure 87. Percentage wetness distribution proportional between native and adventive taxa.

Another major factor in interpreting the park's floristic diversity is that a large portion of the plant species associated with the glades, dry and dry-mesic woodlands, and presumed shrub barrens strongly validate the historic occurrence of open, fire-mediated, species-rich woodlands, and perhaps savanna qualities south of Highway N, especially in and around the dolomite glade knob. Numerous but small isolated populations of conservative grasses, sedges, and forbs were likely more evenly distributed throughout the widespread dry open woodlands, barrens, glades, and to a lesser extent the dry-mesic woodlands.

Landscape Variations Add to Plant Diversity

Highway N runs along the high ridge dissecting Bryant Creek State Park into two different landscapes. South of Highway N, the Gainesville Oak Woodland (Nigh & Schroeder 2002) consists of broad upland flatwoods and dry woodlands. Within this landscape across two square miles, relief varies no greater than 165 feet and is dominated by post oak and shortleaf pine dry woodlands. Deep sandstone ravines and mesic forests are nearly non-existent. Land survey records strongly indicate an open woodland and to some extent savanna/barren tree structure. Fortunately, in the last decade, logging and wildfire have maintained these open conditions. A recent 200-acre prescribed burn has further aided in restoring an open woodland character.

The author spent many hours traversing these open woodlands, flatwoods, and broad dry-mesic bottomland woodlands of Central Hollow. A significant finding was the dramatic increase in both numbers and occurrences of plant species adapted to open, fire-mediated natural communities. In contrast with the sparser vegetation of the same dry sandstone and chert woodland types north of Highway N, herbaceous ground cover here is estimated greater than 50 percent (nearing 80 percent in the prescribed burn area), with potential to move toward the open woodland characteristics seen at Ha Ha Tonka State Park (see images under Dry Sandstone Woodland natural community discussion). Additionally, the park's most significant dolomite glade bald occurs in this area.

North of Highway N, tributaries draining into Bryant Creek have carved deep, rugged river break hills of the Bryant Creek Oak-Pine Woodland/Forest Hills (Nigh & Schroeder 2002). Dropping nearly 400 feet in elevation, Pike, Major, Turkey Run, and a portion of Boiler hollows harbor deep, narrow valley ravines carved through two primary horizontal thick layers of sandstone. Mature to old growth shortleaf pine and white oak dominate narrow ridgetops and south-facing steep hillslopes. Descending into deep fern-clad hollows, one encounters mixed hardwood mesic forests, waterfalls, spicebush seeps, and dry to moist sandstone cliffs and ledges. Equally significant are the distinctive natural communities associated with Coon Den Bluff, and the numerous riparian variations of bottomland forests, gravel bars, streambanks, and sloughs associated with a mature meandering river system. Many plant species occurring in this landscape variation are not found in the same natural communities south of Highway N.

Each landscape type possesses unique variations. For example, all the natural community variations described for dry chert and sandstone woodlands in Nelson (2010) occur in one or the other landscape, adding to aggregate species richness.

Threats to Park Flora

This study reveals a high degree of vascular plant diversity resulting from the great variety of natural communities associated with the region's distinctive landscape. Park staff are commended for their deliberate efforts to initiate ecological restoration. Fortunately, the completion of a significant prescribed burn across a portion of the park's open woodland structure (from recent logging activities) stimulated a positive floristic response. Plant species richness, abundance, and flowering success allowed for a substantial comparison between fire-mediated flora versus untreated areas. Careful, deliberate application of burning is essential toward stimulating and restoring the flora of fire-dependent natural communities and increaseing resilience to threats as described below.

Animal Population Imbalances

While hiking throughout the park's varied landscape over the course of a growing season, I gained insight into how historic human disturbances have impacted the park's flora, and the threats that reduce plant populations. Of disturbing note was the impact of deer browsing, causing a gradual and persistent reduction in flowering success as the growing season progressed. During initial plant growth, I anticipated that plant species would reach successful flowering and seed production. Unfortunately, many individuals of some species were browsed to the point of not flowering. Two examples are offered: 1) by mid-summer in the large dolomite glade, I identified the emerging stems of several charactistic species, including sessile-leaved tick trefoil (*Desmodium sessilifolium*), compass plant (*Silphium laciniatum*), prairie dock (*S. terebinthinaceum*), rosinweed (*S. integrifolium*), and Illinois bundle flower (*Desmanthus illinoensis*), but toward summer's end, few flowering stems were found; 2) large areas of nearly barren groundcover and understory seedlings/saplings especially in closed dry-mesic sandstone woodlands, instead of the expected diversity and abunannce of woodland species found in healthy natural communities, I noted a sparse presence of sedges, ferns, hog peanut (*Amphicarpaea bracteata*), milk pea (*Galactia regularis*), and spike grass (*Chasmanthium latifolium*). The gradual conversion of rich woodland flora toward a simple set of a few dominant species is well documented in forests and woodlands in eastern North America. White tailed deer are causing severe ecological damage in portions of the park, wherebrowsing by large numbers constantly stresses and displaces or eliminates palatable species, and reduces or eliminates understory shrubs and trees.

Damage by armadillos is another serious problem, often overlapping with deer browsing. Armadillos are especially attracted to spicebush seeps, where they dig and wallow in wet mucky soil. Signs of wallowing activity (**Figure 88**) were fresh everywhere, and the damage severe. Their foraging is also pervasive throughout mesic dolomite forests, mostly associated with the steep dolomite talus slopes below the cliffs along Bryant Creek. This activity may be contributing to the rapid spread of Japanese stiltgrass (*Microstegium vimineum*) on talus slopes and streambanks. Although a problem in the region, I did not find any sign of feral hog damage in the park during this study.

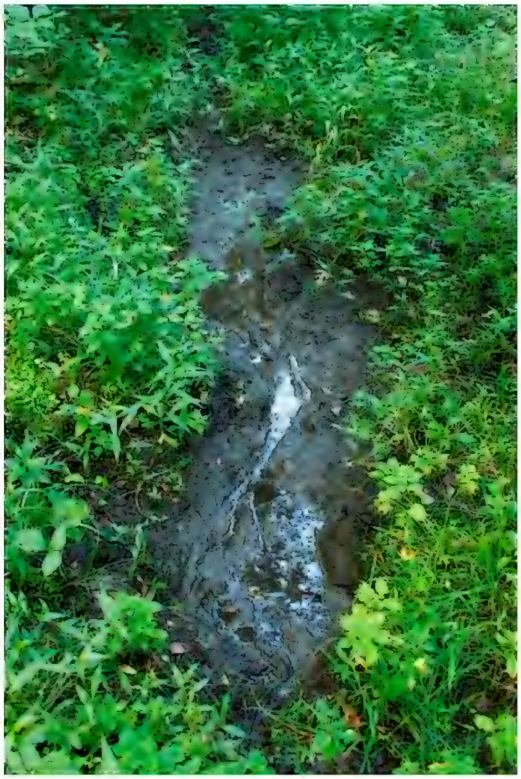

Figure 88. Fresh evidence of armadillo wallowing in a spicebush terrace seep.

Invasive Plants

The majority of introduced species at the park have minimal impacts on native plant presence, composition, and abundance. Examples include many gravel bar and sandbar species such as bouncing bet (*Saponaria officinalis*), carpetweed (*Mullugo verticillata*), and scarlet morning glory (*Ipomoea coccinea*). In contrast, several species are regarded as either invasive — meaning that they cause changes in a variety of natural communities, or noxious — meaning they threaten agriculture or other human resources.

The Missouri Invasive Plants Council (MoIP, 2020) lists 142 species of invasive plants in Missouri. Thirty-one of these species occur in Bryant Creek State Park. Subsequently, a subset of 30 priority invasive species are highlighted by the Missouri Department of Conservation (MDC, 2020) Invasive Plants webpage. These sources provide regional assessment maps for impact severity, abundance, and probable spread of the 30 species for future monitoring. Of particular concern are the 17 invasive plants recorded in the park and prioritized by MDC (2020). Invasive species listed below are grouped by the impacts, or severity to which a species may threaten the park's natural communities following the categories listed by the MoIP. Unless otherwise noted, all the species referenced below are on the MoIP (2020) invasive plant list.

- Severe ecological damage - The following invasive plants are causing or have the potential to cause severe ecological damage to natural communities in the park. Severe as applied here means significant or permanent impacts to ecosystem structure, species composition, ecological processes, light availability, fuels, and soil chemistry. Zone delineations follow the Natural Resources Manangtement Plan for Bryant Creek State Park (McCarty 2021).

Zone 1: Japanese stiltgrass (*Microstegium vimineum*) has altered ecosystem conditions in areas of mesic dolomite forests (**Figure 89**) along the steep hillslopes above the riverbanks of Bryant Creek, and can become abundant on dolomite talus slopes. Its abundance is moderate to high, with nearly 1,000 populations. This alteration is leading to localized extirpation of native plant species. Red cedar (*Juniperus virginiana*) damage to several small dolomite glades north of Highway N is severe, with groups of trees shading and eliminating glade species.

Zone 2: Sericea lespedeza (*Lespedeza cuneata*) is spreading from large populations along the logging roads, open ridgetop flats, and log landings. It has potential to spread into prescribed burn units in the absence of native species competition, and where overly dense woody vegetation is removed, spotted knapweed (*Centaurea stoebe* subsp. *micranthos*), Japanese honeysuckle (*Lonicera japonica*), and autumn olive (*Eleagnus umbellata*) are expected to increase.

Zone 4: Sericea lespedeza (*Lespedeza cuneata*) is ubiquitous (McCarty 2021). Large, nearly solid masses of flowering stems occur throughout all the pastures, producing huge quantities of viable seed. Likewise, tall fescue (*Festuca arundinacea*) occurs in large continuous populations where it (along with Sericea lespedeza) has replaced nearly 100 percent of all native species that occurred before conversion to pasture.

Zone 5: Red cedar (*Juniperus virginiana*) has caused severe damage to dolomite glades, shading and nearly eliminating former glade herbaceous cover.

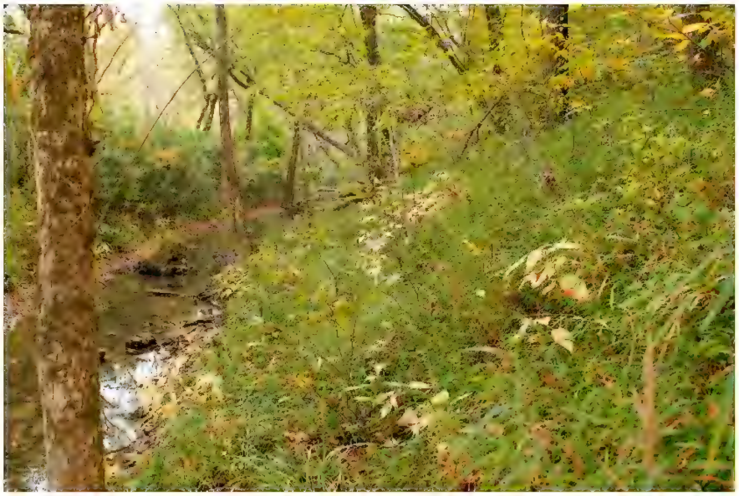

Figure 89. Japanese stiltgrass (*Microstegium vimineum*) forms dense cover in this mesic dolomite forest along a steep slope beneath Pearce Bluff.

- Moderate ecological damage - The following invasive species are currently, or capable of becoming, sufficiently abundant to reduce abundance or cause displacement of native species in natural communities, but seldom cause extirpation. However, without controls to reduce these species, their impacts can become severe.

Zone 1: Multiflora rose (*Rosa multiflora*) occurs widely and can become abundant, especially in mesic bottomland forests of streams, dolomite talus, riverbanks, and riverfront forests.

Zone 2: Autumn olive (*Elaeagnus umbellata*) is scattered in open old fields of ridgetops along the edges of primary logging roads and log landings, and young saplings are scattered in open, previously burned and logged woodlands. Because of its aggressive invasive behavior, this species can become abundant within a decade.

Zone 3: Reed Canary Grass (*Phalaris arundinacea*) occurs sporadically in moist sandy depressions of sandbars, and in slackwater mudflats, generally in full sun. Where present, it forms dense colonies that appear to be expanding. Based on its aggressive potential to spread rapidly, it can become locally abundant, causing displacement of other native riparian species.

Zone 4: Moderate populations (hundreds of plants) of smooth brome (*Bromus inermis*), poverty brome (*B. sterilis*), downy brome (*B. tectorum*), and Johnson grass (*Sorghum halapense*) are scattered throughout old fields. These species (listed by MoIP 2020) can become abundant.

- Low impact in natural communities - The following species are present, but currently with minimal impacts on native plant species. While numbers may currently be low, several of the referenced species are known to rapidly increase and infest natural communities and may be worthy of immediate control efforts to contain population at an early stage.

Zone 2: Spotted knapweed (*Centaurea stoebe* subsp. *micranthos*) is mostly confined to edges of the primary logging road and a few log landings. Bradford pear (*Pyrus calleryana*) is mostly confined to a few small trees near the locked gate to the main dolomite glade and a few trees at the homesite. This species can rapidly spread and is an immediate threat in Zone 2. Poison hemlock (*Conium maculatum*) is present in moderate numbers in areas disturbed by logging equipment, and the gravel wash where the primary logging road crosses Central Hollow. One population of Caucasian bluestem (*Bothriochloa bladhii*) is located near the east locked gate along Highway N.

Zone 3: Johnson grass (*Sorghum halapense*) is scattered along sand and gravel bars while moneywort (*Lysimachia nummularia*) is locally common along moist riverbanks.

Zone 4: Japanese honeysuckle (*Lonicera japonica*) is scattered in the pastures, along with musk thistle (*Carduus nutans*).

Fortunately, the extensive landscape of Bryant Creek State Park, at nearly 3,000 acres, is mostly a mix of intact, restorable natural communities. Most of the plant species observed may increase and recover in enough numbers or occurrences, providing restoration activities and eradication efforts are sustained through time.

Management Considerations

The park's Natural Resource Management Plan (McCarty 2021) succinctly covers natural resource management goals and objectives and implementation of ecological restoration/exotic species activities. The suggestions follow observations made in describing natural communities, and associations of plant families/species best suited to the site's natural disturbance types and patterns.

Fire is an integral natural process and critical for restoring and maintaining much of the park's natural communities. Historic dormant season fires had low impact effects in burning through dry and dry-mesic forests, dolomite talus, and acid seeps. However, prescribed burn contractors may not be aware of such limitations and sensitivity of forest-adapted flora and cryptogams. This is exacerbated by altered fuels loads from anthropogenic activities including decades of fire suppression. Ignition plans should avoid upslope burning through mesic sandstone ravines, spicebush seeps, dry-mesic forests (Coon Den Bluff), bottomland forests, and dolomite talus slopes. Except under exceptional droughts, vegetation adapted to high soil moisture conditions and areas dominated by moss-fern cover generally will not burn; such sites likely had minimal legacy of pre-Eurosetlement fires.

Red cedar (*Juniperus virginiana*) forms stands of dense maturing trees across small dolomite glades north of Highway N associated with the Turkey Run Graben north fault. These red cedars should be removed. In addition, the park's only sandstone glade occurs east of the house on steep slopes above Pike Hollow. Several rare and conservative plant species occur only on these glades.

Potential Natural Area

Several areas in the park potentially qualify for designation as state Natural Areas based on assessments of floristic quality and integrity of natural communities. Of special interest is Coon Den Bluff, which was documented for its natural community quality in the Missouri Natural Heritage Program (Smith 1990). Its principal features are the combination of natural communities associated with a 0.7-mile-long, 300-foot-high bluff. From the highest elevation of 1,040-feet a narrow ridge is capped in dry sandstone woodland which descends a steep (30-45-degree) slope through a dry-mesic sandstone forest. Near the top of the forested bluff, a moist sandstone cliff and ledges 10-20 feet high follows a contour nearly the bluff's entire length. Huge, truck-sized blocks are slumped along the forested slope downward, dropping 200 feet in relief to the vertical edge of a 100-foot dolomite cliff. Most of the dramatic cliff face is dry, eventually becoming moist as it intercepts its pediment below. Numerous wet-weather springs and seeps drip from the edge and along ledges. A rock and boulder strewn steep talus slope with moist dolomite ledges steps down from the pediment, blending with a steep rock and boulder strewn talus slope, then ending along the bank of Bryant Creek.

The author and Doug Ladd (**Figure 90**) traversed the steep dry-mesic sandstone forest to the top edge of the cliffs in September. We discovered several additional features associated with steep bluff disturbances. At least two large slumps occur where steepness and gravity have caused forested soils to slip downward. A second feature is the presence of a small sandstone talus field. Toward the east end of the bluff, occurs a dry-mesic chert forest and moist chert cliff associated with the cryptozoan reef. One option is to delineate a natural area boundary capturing the entire bluff and elongated ridge between Bryant Creek, Pearce Bluff, and Pike Hollow creek. Doing so would also include the park's only sandstone glade and associated acid seep. An estimated 15 natural communities occur within a ca. 350-acre unit. In addition, this study has captured a significant number of plant species associated with these natural communities, including three species of conservation concern.

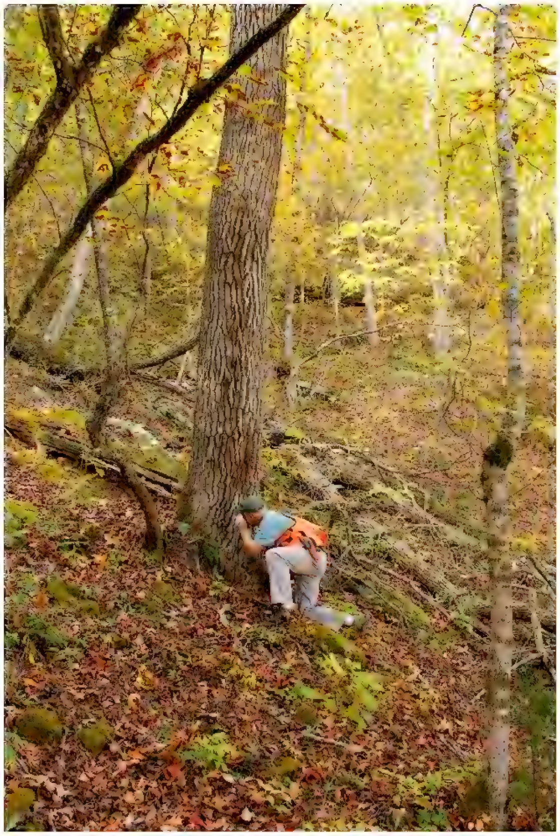

Figure 90. Doug Ladd examines lichens at the base of a large black gum tree (*Nyssa sylvatica*) in this dry-mesic sandstone forest along Coon Den Bluff.

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I thank Carl Bonnell, Park Superintendent at Table Rock State Park, and his staff for logistical support and providing a UTV for site access, without which the project would have taken two collecting seasons as is customary for a master's thesis-style plant study. Natural Resources Steward Chris Crabtree accompanied me on numerous field trips, adding to the list of plant species, including pointing out the identification of *Micranthes palmeri*. George Yatskievych confirmed images of *Carex atlantica* subsp. *atlantica* and *Woodsia obtusa* subsp. *occidentalis*. Justin Thomas located two occurrences of *Persicaria bicornis* during the Bryant Creek foray, and confirmed identifications of *Steinchisma hians*, *Eryngium prostratum*, and *Anthoxanthum odoratum*. Justin and Andrew Braun established nine vegetation monitoring plots across the park, which aided in the development and confirmation of site flora. Chris Crabtree assisted in accessing the plot data via Universal FQA Calculator, which I cross-referenced to natural community descriptions. Hearty thanks to Paul McKenzie and Doug Ladd for joining me in September. Paul's keen eye for grasses and sedges helped add over 20 species, while Doug located *Monotropa hypopitys*, identified *Juncus tenuis* var. *anthelatus*, and confirmed *Symphyotrichum praealtum*.

On September 22, nine botanists joined me in kayaking Bryant Creek with a goal of adding at least 30 additional taxa to the site flora, and ended up adding 38! Paul McKenzie and I then documented an additional 23 species the next day. I am indebted to Andrew Braun, Chris Crabtree, Dan Drees, Susan Farrington, Ron Kolatskie, Ken McCarty, Paul McKenzie, Harlee Scherrer, and Justin Thomas for making the foray. Thanks to Jack and Florice Pearce for generously allowing us access on their property to float Bryant Creek.

Finally, Ken McCarty's vision and passion for increasing knowledge of Bryant Creek's outstanding natural resources provided the impetus for this study. The Missouri Department of Natural Resources, Division of State Parks, Natural Resource Management Program provided the funding for this project.

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APPENDIX: VASCULAR FLORA OF BRYANT CREEK STATE PARK

The following list is arranged hierarchically by taxonomic category, and then alphabetically by family within each category, except that Pteridophytes and Gymnosperms are aggregated and not separated by family. Within each family, taxa are arranged alphabetically generally following Yatskievych (1999, 2006, 2013). Native taxa are rendered in ***bold*** italics and introduced taxa are in SMALL CAPS (note that some taxa introduced at the site may be native elsewhere in Missouri). Scientific name, common name, C-value, abundance/distribution rating, and habitat comments are provided for each taxon; distribution and abundance comments are those used in the field data entry forms and plant database created for this project:

Plant Species Area Distribution

Widespread: Plants are uniformly dispersed and seen in many different natural communities/habitats in the park.

Locally Common: Plants tend to have their highest densities spaced evenly with a high degree of fidelity (faithful) to one or several natural community types or disturbance habitats.

Scattered: Patches of plant populations or individuals are generally separated by large distances but still often found in one or several natural communities or habitats.

Isolated: Small numbers of plants or populations that are far away, secluded, and solitary to the extent they are difficult to locate, or their discovery is purely random and accidental. Example: One population of smoke tree (*Cotinus obovatus*) or one plant of Trelease's larkspur (*Delphinium treleasei*).

Plant Species Abundance

High: Tens of thousands of plants found in large populations.

Moderate: Hundreds of plants seen frequently in referenced habitat or natural community.

Low: Individuals or small populations occurring in low densities; few plants seen occasionally throughout natural community or disturbed habitat.

Rare: Less than 10 population occurrences or less than 100 individuals scattered throughout the park.

Very Rare: One to three individuals or small populations (less than 5) scattered throughout.

For Species of Conservation Concern (MDC 2022), the assigned rating is provided under the abundance column (e.g., SU for Status Undetermined). Numbers in brackets refer to the author's collection numbers for vouchers specimens deposited in MODNR.

PTERIDOPHYTES — 34 TAXA

Ferns, Quillworts, Spikemosses, Horsetails

Scientific Name	C-value	Common Name	Abundance
Adiantum pedatum var. ***pedatum***	6	Maidenhair Fern	Locally Common
Mesic to dry mesic soils of forests and woodlands, talus slopes, moist ledges			
Asplenium pinnatifidum	10	Lobed Spleenwort	Rare (SU)
Cracks of exposed sandstone ledges in dry woodlands of Pike and Major Hollows [2100]			
Asplenium platyneuron	4	Ebony Spleenwort	Moderate
Scattered in old fields, dry and dry-mesic rocky woodlands, ledges			
Asplenium resiliens	9	Black Spleenwort	Low
Isolated on shaded crevices of dolomite ledges and cliffs.			
Asplenium rhizophyllum	7	Walking Fern	Low
Isolated primarily moss-covered dolomite boulders and ledges of dolomite talus slopes			
Athyrium filix-femina	8	Lady Fern	Rare
Sandstone ledges of spicebush seep in north-facing dry-mesic sandstone forest			
Botrychium dissectum	5	Cut-Leaved Grape Fern	Scattered
Upland flatwoods, overgrown old fields, mesic bottomland forests.			
Botrychium virginianum var. ***virginianum***	4	Rattlesnake Fern	Low
Dry mesic sandstone forest, mesic bottomland forest and woodland			
Cheilanthes feei	8	Slender Lip Fern	Low
Restricted to dry dolomite cliff ledges top of Coon Den Bluff			
Cheilanthes lanosa	7	Hairy Lip Fern	Moderate
Top of dry sandstone ledges and large boulders			
Cystopteris bulbifera	8	Bulblet Fern	Low
Crevices and ledges of moist dolomite cliffs			
Cystopteris protrusa	5	Southern Fern	Moderate
Mesic dolomite and sandstone forests, dolomite talus along Bryant Creek only			
Cystopteris tennesseensis	8	Tennessee Bladder Fern	High
Moist dolomite cliffs and boulders/ledges in mesic dolomite forest			
Deparia acrostichoides	10	Silvery Spleenwort	Rare
Colonies in spicebush seeps of main valley west of house			
Diplazium pycnocarpon	10	Narrow-Leaved Spleenwort	Moderate
Throughout mesic dolomite talus along Coon Den Bluff only			
Dryopteris marginalis	7	Marginal Shield Fern	Moderate
Locally common on moist sandstone cliffs and ledges; isolated on dolomite talus			
Equisetum hyemale var. ***affine***	3	Scouring Rush	Moderate
Along shaded moist streambank of Bryant Creek			
Equisetum laevigatum	4	Scouring Rush	Rare
Mesic bottomland forest along dry stream terrace draining to Bryant Creek			
Isoetes butleri	8	Butler's Quillwort	Very Rare
Wet seepage along lower portion of dolomite glade; two plants observed			

MATTEUCCIA STRUTHIOPTERIS var. PENSYLVANICA		Ostrich Fern	Very Rare
Despite mowing and weeding, persistently sprouting behind house by back door			
Onoclea sensibilis	6	Sensitive Fern	Low
Few occurrences moist stable streambanks base of talus and ledges along Bryant			
Ophioglossum engelmannii	7	Glade Adder's Tongue	Very Rare
Less than 10 plants in two isolated populations on dolomite glade			
Osmunda regalis var. ***spectabilis***	8	Royal Fern	Very Rare
One occurrence along edge of acid seep-fed stream on sandstone bedrock			
Pellaea atropurpurea	7	Purple Cliff Brake	Moderate
Scattered on dry ledges and boulders of dolomite glades and dry dolomite woodland			
Pellaea glabella	9	Smooth Cliff Brake	Low
In cracks and crevices of dolomite and chert cliffs east Coon Den Bluff			
Phegopteris hexagonoptera	8	Broad Beech Fern	High
Widespread in most deep mesic sandstone ravines, spicebush seeps, and mesic terraces			
Polypodium polypodioides	8	Resurrection Fern	Rare
Edge of dry mossy dolomite cliff along Coon Den Bluff			
Polypodium virginianum	9	Common Polypody	Low
Occasional on large sandstone blocks and ledges of dry-mesic woodlands			
Polystichum acrostichoides	5	Christmas Fern	High
Widespread in dry-mesic and mesic forest and woodlands, dolomite talus			
Pteridium aquilinum	4	Bracken Fern	Moderate
Upland open dry chert/sandstone woodlands and flatwoods south of Highway N			
Selaginella apoda	8	Marsh Spikemoss	Very Rare
Restricted to moss-covered gravel of acid seep at base of sandstone glade			
Selaginella eclipes	8	Hidden Spikemoss	Low
Scattered about seepage beneath waterfalls, base of cliffs, shaded recesses of ledges [2099]			
Woodsia obtusa subsp. ***obtusa***	5	Cliff Fern	Moderate
Crevices of sandstone/dolomite/chert in woodlands, forests, cliffs.			
Woodsia obtusa subsp. ***occidentalis***	10	Cliff Fern	Very Rare (SU)
Several clumps in moist opening of pine-dominated upland flatwoods south of Hwy N [2113]			

GYMNOSPERMS — 4 TAXA

Scientific Name	C-value	Common Name	Abundance
Juniperus virginiana var. ***virginiana***	2	Red Cedar	Moderate
Confined to dolomite glades and a few old fields			
Pinus echinata	5	Shortleaf Pine	High
Widespread in dry and dry-mesic sandstone/chert woodlands, and upland flatwoods			
PINUS STROBUS		Eastern White Pine	Very Rare
One tree noted behind house			
Taxodium distichum var. ***distichum***	8	Bald Cypress	Very Rare
Small populations in spicebush seep and around native sinkhole depression — these populations may represent a slight native range extension for the species in Missouri, as there were no signs of planting in these remote sites distant from any habitation			

ANGIOSPERMS

Monocots — 263 TAXA

AGAVACEAE — 2 Taxa

Scientific Name	**C-value**	**Common Name**	**Abundance**
Manfreda virginica	7	American Aloe	Rare
Scattered around dolomite glades			
YUCCA SMALLIANA		Adam's Needle	Rare
Isolated in Simpson Pasture			

ALISMATACEAE — 3 Taxa

Scientific Name	**C-value**	**Common Name**	**Abundance**
Alisma triviale	3	Large-Flowered Water Plantain	Rare
Stagnant slough along Bryant Creek; water-filled deep road ruts			
Sagittaria brevirostra	5	Engelmanns Arrowhead	Very Rare
Isolated population in stagnant slough			
Sagittaria latifolia var. ***latifolia***	4	Common Arrowhead	Moderate
Scattered in stagnant sloughs, mudflats of backwaters, and one artificial pond			

ARACEAE — 2 Taxa

Scientific Name	**C-value**	**Common Name**	**Abundance**
Arisaema triphyllum subsp. ***triphyllum***	6	Jack-in-the Pulpit	Low
Moist dolomite ledges, dolomite talus, mesic dolomite forest			
Arisaema dracontium	6	Green Dragon	Rare
Mesic bottomland forest along Bryant Creek			

ASPARAGACEAE — 1 Taxon

Scientific Name	**C-value**	**Common Name**	**Abundance**
HYACINTHUS ORIENTALIS		Hyacinth	Very Rare
Few clumps growing in yard			

COMMELINACEAE — 4 Taxa

Scientific Name	**C-value**	**Common Name**	**Abundance**
COMMELINA COMMUNIS		Common Dayflower	Low
Scattered on gravel bars, yard, old field, roadsides, dry-mesic bottomland forests			
Tradescantia longipes	8	Wild Crocus	Rare
Isolated on exposed open dry cherty woodlands			
Tradescantia ohiensis	3	Common Spiderwort	Moderate
Scattered in open dry chert woodlands, dry-mesic bottomland woodland, roadsides			
Tradescantia ozarkana	10	Ozark Spiderwort	Very Rare (S2)
Isolated in mesic dolomite forest along Bryant Creek			

CYPERACEAE — 70 Taxa

Scientific Name	C-value	Common Name	Abundance
Carex albicans var. ***albicans***	6	Bellows-Beaked Sedge	High
Locally common in dry to dry-mesic open chert and sandstone woodlands and forests			
Carex albursina	9	White Bear Sedge	Moderate
Scattered along mesic dolomite talus slope and moist ledges below Coon Den Bluff			
Carex amphibola	3	Narrow-Leaved Sedge	Moderate
Dry and dry-mesic woodlands, mesic bottomland forests, and riverfront forests			
Carex annectens var. ***annectens***	4	Yellow-Fruited Sedge	Low
Wet open depressions, mud ruts, spicebush terrace seeps			
Carex atlantica subsp. ***atlantica***	10	Prickly Bog Sedge	Very Rare (S1)
Acid seep at base of sandstone glade			
Carex austrina	5	Southern Sedge	Rare
In water-filled rutted depression of old logging road on upland flatwoods			
Carex blanda	2	Common Wood Sedge	Moderate
Scattered in mesic sandstone/dolomite forests, mesic and dry-mesic bottomland forests			
Carex brevior	4	Short-Beaked Sedge	Rare
Along embankment of artificial pond in front of house			
Carex bushii	4	Bush's Sedge	Low
Cherty openings of dolomite glade, dry chert woodland, powerline ROW, roadsides.			
Carex careyana	9	Carey's Sedge	Moderate
Large population confined to mesic dolomite talus below Pearce Bluff [2103]			
Carex cephalophora	5	Woodbank Sedge	Moderate
Scattered in dry chert/sandstone woodland, pasture, yard			
Carex cherokeensis	7	Cherokee Sedge	Very Rare
One occurrence in degraded fen [2124]			
Carex crawei	10	Crawe's Sedge	Low
Dolomite glade			
Carex crinita	7	Fringed Sedge	Rare
Isolated clumps in spicebush terrace seeps of deep valleys			
Carex davisii	3	Davis' Sedge	Rare
Few plants in mesic bottomland forest along Bryant Creek			
Carex digitalis	7	Narrow-Leaved Wood Sedge	Moderate
Scattered in mesic sandstone/dolomite forests, mesic bottomland forests			
Carex digitalis var. ***macropoda***	7	Narrow-Leaved Wood Sedge	Rare
One occurrence in mesic bottomland forest along Bryant Creek [2109]			
Carex eburnea	3	Bristle-leaved Sedge	Moderate
Locally common throughout crevices and ledges of dolomite cliff and around red cedars on glades and cliff tops			
Carex emoryi	6	Emory's Sedge	Rare
Colonies of mudflat slackwater of Bryant Creek			

Carex festucacea	5	Fescue Sedge	Low
Scattered in Ozark fen, mesic bottomland forest, roadside ROW			
Carex frankii	2	Frank's Sedge	Moderate
Scattered in wet depressions of Simpson's Pasture, margins of pond at house			
Carex glaucodea	4	Blue Sedge	Moderate
Scattered throughout upland flatwoods and dry sandstone woodlands on ridges			
Carex granularis var. ***haleana***	4	Meadow Sedge	Low
Isolated around Ozark fens, spicebush terrace seeps, mesic bottomland terrace forests			
Carex gravida	5	Heavy Sedge	Rare
Scattered sparsely in Simpson Pasture			
Carex grisea	4	Gray Sedge	Moderate
Mesic bottomland forest			
Carex hirsutella	4	Fuzzy Wuzzy Sedge	High
Upland flatwoods, dry sandstone and chert woodland, roadsides, ROWs			
Carex hirtifolia	7	Hairy Sedge	Rare
Mesic bottomland forest along Bryant Creek			
Carex hystericina	7	Bottlebrush Sedge	Rare
Scattered in spicebush terrace seeps, ravine side slope seeps			
Carex jamesii	4	Grass Sedge	High
Mesic dolomite and bottomland forest, dolomite talus, dry-mesic bottomland woodland			
Carex lurida	6	Sallow Sedge	Low
Spicebush terrace seep, Ozark fen, edge of artificial pond			
Carex meadii	6	Mead's Sedge	Low
Dolomite glade			
Carex mesochorea	3	Oval-Headed Sedge	Low
Scattered along edge of Simpson Pasture			
Carex molesta	3	Troublesome Sedge	Rare
Ozark fen			
Carex muehlenbergii var. ***enervis***	8	Sand Sedge	Low
Scattered in cherty openings of dry chert woodland			
Carex nigromarginata var. ***nigromarginata***	7	Black-Edged Sedge	Moderate
Scattered in upland flatwoods, dry chert and sandstone woodland [2102]			
Carex oligocarpa	6	Few-Fruited Sedge	High
Common in dry and dry-mesic sandstone, chert, dolomite woodland, upland flatwoods			
Carex retroflexa	4	Reflexed Sedge	Moderate
Dry woodlands, upland flatwoods			
Carex rosea	6	Stellate Sedge	Low
Spicebush terrace seep and mesic bottomland terrace forest			
Carex squarrosa	6	Squarrose Sedge	Rare
One clump found in water-filled deep ruts of old logging road			

Carex suberecta	9	Prairie Straw Sedge	Very Rare	Isolated in Ozark fen
Carex texensis	3	Texas Sedge	Moderate	Isolated in spicebush terrace seeps; scattered in mesic bottomland terrace forest [2108]
Carex umbellata	6	Umbel-Like Sedge	Moderate	Scattered in exposed openings of dry chert and sandstone woodlands
Carex vulpinoidea	3	Fox Sedge	Low	Wet depressions in open upland flatwoods, old dirt road ruts, pasture
Cyperus acuminatus	3	Short-Pointed Cyperus	Rare	Low depression of opening in upland flatwoods
Cyperus echinatus	3	Ball Sedge		Sandstone glade, road ROW, yard
Cyperus esculentus	0	Chufa	Low	Gravel bar
Cyperus odoratus	3	Fragrant Flatsedge	Low	Gravel bar
Cyperus refractus	6	Reflexed Flatsedge	Low	Isolated in dry mesic bottomland woodlands, gravel washes, riverfront forests
Cyperus retroflexus	6	One-Flowered Flatseed	Very Rare (S1)	Dry sandy eroded bank along Bryant Creek [2132]
Cyperus squarrosus	3	Awned Flatseed	High	Locally common on mudflats and edge of sandbars along Bryant Creek
Cyperus strigosus	1	Straw-Colored Flatsedge	Rare	Isolated occurrences on gravel bars of Bryant Creek
Eleocharis compressa var. ***compressa***	5	Flat-Stemmed Spike Rush	Moderate	Widespread across dolomite glades and dry dolomite woodland
Eleocharis engelmannii	5	Engelmann's Spike Rush	Low	Edge of artificial pond
Eleocharis erythropoda	5	Bald Spike Rush	Moderate	Sandbars and mudflats along Bryant Creek
Eleocharis obtusa	2	Blunt Spike Rush	Low	Edge of ponds, mud ruts of old logging roads, wet depressions in upland flatwoods
Eleocharis palustris	5	Marsh Spike Rush	Very Rare	Edge of artificial pond [2121]
Eleocharis verrucosa	4	Slender Spike Rush	High	Dense mats on seepy sandstone glade
Fimbristylis autumnalis	5	Autumn Sedge	Moderate	Common on mudflats, sloughs, and moist sand depressions of sandbars along Bryant Ck
Fimbristylis puberula var. ***puberula***	7	Glade Fimbry	Moderate	Isolated populations on dolomite glades
Fuirena simplex var. ***simplex***	8	Umbrella Grass	Very Rare	Ozark fen and isolated on mudflats of Bryant Creek [2131]

Lipocarpha micrantha	5	Common Dwarf Bulrush	Very Rare
Confined to edges of stagnant pool of old slough along Bryant Creek [2135]			
SCHOENOPLECTUS MUCRONATUS		Bog Bulrush	Moderate
Abundant in several artificial ponds			
Schoenoplectus pungens	10	Chairmaker's Rush	Very Rare
Scattered along gravel bar edge stabilized by water willow			
Schoenoplectus tabernaemontana	5	Great Bulrush	Very Rare
Few stems in shallow old artificial pond			
Scirpus atrovirens	3	Dark Green Rush	Low
Dolomite spring and isolated along riverbank of Bryant Creek			
Scirpus pendulus	3	Red Bulrush	Moderate
Depressions in flatwoods, water-filled road ruts, ditches, gravel washes, pasture			
Scleria oligantha	8	Few-Flowered Nut Rush	Low
Scattered in dolomite glade and open dry chert woodland			
Scleria pauciflora	6	Papillose Nut Rush	Low
Open wet depressions of upland flatwoods and dolomite glade			
Scleria triglomerata	6	Tall Nut Rush	Moderate
Rocky openings of dry chert and sandstone woodlands			
Trichophorum planifolium	9	Wood Club-Rush	Low
Restricted to a few locations in dry-mesic chert and sandstone woodlands			

DIOSCOREACEAE — 2 Taxa

Scientific Name	C-value	Common Name	Abundance
Dioscorea quaternata	5	Four-Leaved Yam	Low
Widely scattered in dry-mesic sandstone forests and dolomite woodlands, mesic dolomite forests, and dolomite talus slopes			
Dioscorea villosa	5	Wild Yam	Low
One occurrence in gravel bar thicket			

IRIDACEAE — 4 Taxa

Scientific Name	C-value	Common Name	Abundance
IRIS PALLIDA		Sweet Iris	Very Rare
Few plants in yard			
Nemastylis nuttallii	9	Nuttall's Prairie Iris	Very Rare
One fruiting plant found on dolomite glade; not located during growing season			
Sisyrinchium angustifolium	5	Pointed Blue-Eyed Grass	Low
Isolated occurrences in dry-mesic bottomland woodlands and forests, mesic bottomland forests, riverfront forests, gravel washes			
Sisyrinchium campestre	5	Prairie Blue-Eyed Grass	Low
Dolomite glade, open dry chert woodland			

JUNCACEAE — 12 Taxa

Scientific Name	C-value	Common Name	Abundance
Juncus acuminatus	4	Sharp-Fruited Rush	Low
Scattered in low depressions of upland flatwoods and along gravel roads			
Juncus biflorus	5	Two-Flowered Rush	Rare
Isolated in low moist depression in fescue opening of upland flatwoods [2123]			
Juncus dudleyi	6	Dudley's Rush	Low
In seeps of Ozark fens and dolomite springs			
Juncus effusus subsp. ***solutus***	4	Common Rush	Very Rare
Several stems growing in standing water of deep dirt ruts on upland flatwoods			
Juncus interior	5	Inland Rush	Low
Wet depression in lower portion of dolomite glade			
Juncus marginatus	4	Grass-Leaved Rush	Rare
Wet dirt road rut depression in upland flatwoods			
Juncus nodatus	6	Stout Rush	Very Rare
Several plants confined to acid seep near sandstone glade			
Juncus secundus	5	Secund Rush	Low
Wet depression in dolomite glade and upland flatwoods			
Juncus tenuis var. ***anthelatus***	2	Path Rush	Very Rare
One small population in wet road rut depression of upland flatwoods			
Juncus tenuis var. ***tenuis***	0	Path Rush	Moderate
Common along barren dirt of woods roads and old logging roads; pastures and yards			
Luzula campestris var. ***bulbosa***	4	Wood Rush	Low
Scattered in open exposed soil of dry and dry-mesic chert and sandstone woodlands			
Luzula campestris var. ***multiflora***	4	Wood Rush	Rare
Along moist exposed sandstone ledges			

LEMNACEAE — 2 Taxa

Scientific Name	C-value	Common Name	Abundance
Lemna aequinoctialis	5	Lesser Duckweed	Very Rare
Small population in mud of drying artificial pond			
Wolffia braseliensis	8	Pointed Water Meal	High
Abundant in one artificial pond north of house			

LILIACEAE — 17 Taxa

Scientific Name	C-value	Common Name	Abundance
Allium canadense var. ***canadense***	2	Wild Garlic	Low
Dry sandstone woodland, dry-mesic bottomland woodland and forest, gravel washes			
Allium mutabile	7	Glade Onion	Moderate
Scattered in dolomite glade and dry dolomite woodlands			
Allium stellatum	6	Prairie Onion	Low
Scattered in dolomite glade			

ALLIUM VINEALE		Field Garlic	Low
Pasture, yard, along logging roads, log landings			
Camassia scilloides	6	Wild Hyacinth	Moderate
Dolomite glade and dry dolomite woodlands			
Erythronium albidum	5	White Trout Lily	Moderate
Dry and dry-mesic chert/sandstone woodland, mesic dolomite forest, mesic bottomland forest, dolomite glade			
HEMEROCALLIS FULVA var. FULVA		Day Lily	Very Rare
Near house			
Hypoxis hirsuta	5	Yellow Star Grass	Low
Dry chert and dolomite woodland, dolomite glade			
Maianthemum racemosum subsp. ***racemosum***	4	Feathery False Solomon's Seal	Low
Mesic dolomite and sandstone forest and talus slope, moist dolomite cliff			
NARCISSUS POETICUS		Poet's Narcissus	Very Rare
In yard			
Narcissus pseudonarcissus		Daffodil	Rare
In yard, spreading			
Nothoscordum bivalve var. ***bivalve***	4	False Garlic	Moderate
Scattered in dolomite glades, dry chert/dolomite woodlands			
Polygonatum biflorum var. ***commutatum***	4	Smooth Solomon's Seal	Low
Mesic dolomite and sandstone forest, dolomite talus, moist dolomite cliff			
Trillium sessile	5	Toad Trillium	Moderate
Scattered mesic dolomite and chert forest, dry-mesic dolomite forest, mesic dolomite talus, moist dolomite cliff			
TULIPA sp.		Tulip	Very Rare
Scattered in garden and yard			
Uvularia grandiflora	6	Bellwort	Moderate
Mesic sandstone and dolomite forest, Dry-mesic chert forest, dolomite talus, moist dolomite and sandstone cliff, spicebush terrace seeps, ravine spicebush seeps			
Veratrum woodii	8	False Hellebore	Moderate
Dolomite talus, moist dolomite cliff, mesic dolomite forest			

ORCHIDACEAE — 14 Taxa

Scientific Name	C-value	Common Name	Abundance
Aplectrum hyemale	8	Putty Root Orchid	Very Rare
Pike Hollow only on mesic bottomland terrace forests			
Corallorhiza odontorhiza	6	Late Coral Root	Very Rare
Two flowering plants in dry-mesic sandstone forests along Coon Den Bluff			
Corallorhiza wisteriana	7	Wister's Coral Root	Low
Isolated occurrences in dry-mesic sandstone woodland, dry-mesic bottomland woodland, gravel wash			

Cypripedium calceolus var. ***parviflorus***	8	Small Yellow Lady's Slipper	Low
Scattered in dry-mesic sandstone and dolomite forest, mesic dolomite forest			
Cypripedium reginae	10	Showy Lady's Slipper	Very Rare (S2S3)
Dozen flowering plants on seepy moist dolomite cliff ledge			
Galearis spectabilis	7	Showy Orchis	Very Rare
One plant flowering along dolomite spring of Pike Hollow			
Goodyera pubescens	10	Rattlesnake Plantain	Very Rare
Several plants found in dry-mesic and mesic sandstone forests			
Hexalectris spicata	8	Crested Coral Root	Very Rare
Four plants observed in red cedar grove on dolomite glade bald			
Liparis liliifolia	7	Purple Twaybladee	Rare
Isolated occurrences in dry-mesic chert woodlands and forests			
Spiranthes cernua	5	Nodding Ladies' Tresses	Rare
Sandstone glade			
Spiranthes lacera	6	Slender Ladies' Tresses	Low
Openings in upland flatwoods, dolomite glade, old logging roads, pasture			
Spiranthes magnicamporum	7	Dune Ladies' Tresses	Rare
Dolomite glades			
Tipularia discolor	10	Crane Fly Orchid	Very Rare (S3)
Rotting log debris in ravine of mesic sandstone forest; deep leaf litter upland flatwoods			
Triphora trianthophora	9	Nodding Pogonia	Rare
Scattered along valley streams terraces in mesic bottomland forests			

POACEAE — 121 Taxa

Scientific Name	C-value	Common Name	Abundance
Agrostis elliottiana	3	Awned Bent Grass	Low
Scattered on sterile soil of dry sandstone woodland, sandstone ledges, gravel roadsides			
Agrostis hyemalis var. ***hyemalis***	3	Tickle Grass	Low
Dry sandstone woodland, moist dolomite cliff			
Agrostis perennans var. ***perennans***	3	Upland Bent Grass	Low
Dry chert woodland, roadside ROW			
Alopecurus carolinianus	0	Annual Foxtail	Very Rare
One plant observed in degraded Ozark Fen at dolomite spring road crossing			
Andropogon gerardii	5	Big Bluestem	Low
Scattered in mostly open dry chert and sandstone woodland south of Hwy N, dolomite glade, roadside ROW			
Andropogon gyrans var. ***gyrans***	3	Elliott's Broom Sedge	Low
Isolated in sterile, gravelly dry chert and sandstone woodlands, and roadsides			
Andropogon virginicus var. ***virginicus***	2	Broom Sedge	Moderate
Dry open chert and sandstone woodlands mostly south of Hwy N, log landings, logging roads, pastures, highway ROW, powerline Row			

ANTHOXANTHUM ODORATUM		Sweet Vernal Grass	High
Locally common edge of logging roads, log landings south Hwy N where intersecting dry chert and sandstone woodlands, upland forests; possibly future aggressive invasive [2115]			
Aristida dichotoma var. ***curtissii***	3	Churchmouse Three-Awn	Moderate
Locally common across dolomite glades			
Aristida dichotoma var. ***dichotoma***	3	Poverty Grass	Low
Widely scattered on dolomite glades			
Aristida longespica var. ***longespica***	2	Slimspike Three-Awn	Low
Isolated occurrences on dolomite glade			
Aristida oligantha	1	Plains Three-Awn Grass	Moderate
Scattered in sterile open soils of stable yard, pond embankments, pastures, edge of dirt roads, log landings, dolomite glade			
Aristida purpurascens	5	Arrow Feather	Low
Widely scattered on dolomite glade			
Arundinaria gigantea	7	Giant Cane	High
Forms large dense colony structure in primary riverfront forest, and stable streambanks along Bryant Creek			
BOTHRIOCHLOA BLADHII		Caucasian Bluestem	Rare
Restricted to edge of logging road near east gate			
Bothriochloa laguroides subsp. ***torreyana***	0	Silver Beard Grass	Low
Scattered sparingly along Hwy N ROW			
Bouteloua curtipendula	7	Side-Oats Grama	Low
Scattered on dolomite glade			
Brachyelytrum erectum	5	Low-Awned Wood Grass	Moderate
Scattered colonies in upland forests, dry and dry mesic chert and sandstone woodlands			
BROMUS HORDEACEUS subsp. HORDEACEUS		Soft Chess	Moderate
Locally common along dirt roads through Simpson Pasture			
BROMUS INERNIS		Smooth Brome	Low
Scattered dense populations in Simpson's Pasture and field west of stable			
Bromus pubescens	5	Woodland Brome	Moderate
Scattered in dry-mesic chert woodlands, dry sandstone woodlands, dry-mesic dolomite forests			
BROMUS STERILIS		Poverty Grass	Moderate
Isolated but dense colonies in pastures, roadside ROW, and yard			
BROMUS TECTORUM var. TECTORUM		Downy Brome	Low
Along Hwy N ROW			
Chasmanthium latifolium	4	Spike Grass	Moderate
Locally common and likely increasing where browsed in upland flatwoods, dry-mesic woodlands and forests, pastures, dry-mesic bottomland woodlands			
Chloris verticillata	0	Windmill Grass	Very Rare
Confined around stable			

Cinna arundinacea	7	Common Wood Reed	Low	Widely scattered in riverfront forest, mesic bottomland forests (including stream terraces), and along forested streambanks
CYNODON DACTYLON		Bermuda Grass	Very Rare	House yard only
DACTYLIS GLOMERATA		Orchard Grass	Low	Scattered in Simpson's Pasture
Danthonia spicata	3	Poverty Oat Grass	High	Locally common in dry chert and sandstone woodlands, dry-mesic sandstone woodlands, upland flatwoods, in gravelly old logging roads, dolomite glade
Diarrhena obovata	6	Obovate Beak Grass	Low	Scattered in riverfront and mesic bottomland forests
Dichanthelium ashei	7	Ashe's Panic Grass	Low	Widely scattered in dry chert and sandstone woodlands
Dichanthelium bicknellii	6	Bicknell's Panic Grass	Rare	Confined to steep, open dry chert woodlands [2118]
Dichanthelium boscii	5	Bosc's Panic Grass	Moderate	Dry and dry-mesic chert and sandstone woodlands, dry-mesic sandstone forests
Dichanthelium clandestinum	4	Deer Tongue Grass	Low	Dry sandstone woodland, dry-mesic bottomland woodlands, gravel washes, gravel bars, riverbanks, depressions in pastures
Dichanthelium commutatum* var. *commutatum	7	Variable Panic Grass	Low	Open dry chert woodlands
Dichanthelium dichotomiflorum	0	Knee Grass	Moderate	Scattered in upland flatwoods, dry and dry-mesic chert, sandstone woodlands
Dichanthelium dichotomum* var. *barbulatum	6	Forked Panic Grass	Moderate	Scattered in dry chert and sandstone woodlands
Dichanthelium dichotomum* var. *dichotomum	8	Forked Panic Grass	Low	Dolomite glade
Dichanthelium lanuginosum	2	Woolly Panic Grass	High	Widely Scattered in dry and dry-mesic chert and sandstone woodlands, upland flatwoods, pastures, along logging roads, log landings, dolomite glade, ROW's
Dichanthelium laxiflorum	6	Lax-Flowered Panic Grass	Low	Scattered in upland flatwoods, dry and dry mesic chert woodlands, dry sandstone woodlands, dry-mesic bottomland forests.
Dichanthelium linearifolium	5	Slender-Leaved Panic Grass	Low	Widely scattered in dry chert and sandstone woodlands, along dry sandstone ledges
Dichanthelium longiligulatum	4	Coastal Plain Panic Grass	Low	Riverfront forest and edge of artificial pond

Dichanthelium malacophyllum	5	Soft-Leaved Panic Grass	Rare
Found in yard by Justin Thomas			
Dichanthelium oligosanthes var. ***scribnerianum***	4	Soft-Leaved Panic Grass	Low
Dry sandstone and chert woodlands mostly south of Hwy N, edge of pasture			
Dichanthelium praecocius	9	Early-Branched Panic Grass	Low
Open dry chert woodland on steep slope [2112]			
Dichanthelium ravenelii	7	Ravenell's Panic Grass	Low
Scattered in dry chert woodland and sandstone glade			
Dichanthelium scoparium	6	Velvety Panic Grass	Low
Dolomite glade, upland flatwoods, Dry chert woodlands			
Dichanthelium sphaerocarpon var. ***sphaerocarpon***	5	Round-Fruited Panic Grass	Moderate
Dolomite glade, open dry chert and sandstone woodlands			
Dichanthelium villosissimum	6	White Haired Panic Grass	Low
Mostly exposed southwest rocky slopes of dry chert and sandstone woodlands			
Dichanthelium werneri	7	Werner's Panic Grass	Low
Scattered in dry chert and sandstone woodlands			
DIGITARIA CILIARIS		Southern Crabgrass	Low
Widely scattered on sand and gravel bars			
DIGITARIA ISHAEMUM		Smooth Crabgrass	Moderate
Abundant around house, roadsides, logging roads			
ECHINOCHLOA CRUSGALLI		Barnyard Grass	Low
Water's edge of pond			
Echinochloa muricata	2	Cockspur Grass	Low
Several plants in Ozark fen and along gravel wash			
ELEUSINE INDICA subsp. INDICA		Indian Goose Grass	Low
Scattered on gravel and sandbars			
Elymus glabriflorus	4	Southeastern Wild Rye	Moderate
Dry sandstone and chert woodlands, Hwy ROW, upland pastures			
Elymus hystrix	4	Bottlebrush Grass	Low
Moist dolomite cliff (ledges), riverfront forests, dry-mesic bottomland woodlands			
ELYMUS REPENS		Quack Grass	Low
Along highway ROW			
Elymus riparius	7	Riverbank Wild Rye	Low
Riverbank, open riverfront forests, gravel bars			
Elymus villosus	4	Silky Wild Rye	Low
Scattered in riverfront forests, riverbank			
Elymus virginicus var. ***virginicus***	5	Virginia Wild Rye	Moderate
Riverfront forests, mesic bottomland forests			
Eragrostis capillaris	3	Lace Grass	Rare
Several plants in powerline ROW across dry chert woodland			

ERAGROSTIS CILIANENSIS		Stink Grass	Low	Scattered in sandy open riverfront forests, sandbars and gravel bars
ERAGROSTIS CURVULA		Weeping Love Grass	Very Rare	Several sterile clumps on logging road embankment next to east gate; often planted on highway ROWs to stabilize steep eroding banks; can become invasive
Eragrostis frankii	3	Sandbar Love Grass	Rare	Scattered in gravel washes, Ozark fen
Eragrostis hirsuta	4	Bigtop Love Grass	Low	Open sandy/gravelly riverfront forests, dolomite glade
Eragrostis hypnoides	4	Creeping Love Grass	Very Rare	Several plants on sand bank along recently filled slough across from Coon Den Bluff
ERAGROSTIS MINOR		Little Love Grass	Low	Widely scattered clumps on gravel and sandbars along Bryant Creek
Eragrostis spectabilis	3	Purple Love Grass	Low	Dolomite glade, open dry chert woodland (south of Hwy N), log landings, pastures, Hwy N ROW
Eragrostis trichoides	4	Tall Love Grass	Low	Open dry chert woodland
Erianthus alopecuroides	8	Silver Plumegrass	Low	Locally in open dry chert and sandstone woodland, mostly non-flowering culms
FESTUCA ARUNDINACEA		Tall Fescue	High	Widespread dominant grass in Simpson Pasture, planted in old log landings, overgrown pastures in upland flatwoods south side of park, highway ROW, eroded riverbanks
Festuca paradoxa	6	Cluster Fescue	Low	Sandstone ledges in dry sandstone woodland
Festuca subverticillata	4	Nodding Fescue	Moderate	Dry-mesic and mesic sandstone and dolomite forests, gravel washes
Glyceria striata	4	Fowl Manna Grass	Moderate	Common around dolomite springs, spicebush seeps, seepy waterfalls, riverbanks
Gymnopogon ambiguus	8	Beard Grass	Rare	Mostly on sandstone glades, open dry sandstone woodlands above ledges, sparsely in dry chert woodlands [2130]
Hordeum pusillum	0	Little Barley	Very Rare	Few plants around stable
Leersia oryzoides	3	Rice Cut Grass	Low	Artificial pond margins, margin of sloughs and slackwater mudflats along Bryant Creek
Leersia virginica var. ***virginica***	4	White Grass	Moderate	Scattered in depressions and muddy road ruts of upland flatwoods; mesic bottomland terrace forests, stream margins, mesic dolomite forests, seeps
Melica nitens	6	Melic Grass	Rare	Low ledges and shade of red cedar in dry dolomite woodlands around glades
MICROSTEGIUM VIMINEUM		Japanese Stiltgrass	High	Dense cover along base of dolomite talus slopes down to streams edge of Bryant Creek. Disturbed gravel spoils of graded drainage ditches along gravel roads, gravel washes, dry-mesic chert forests.

Muhlenbergia capillaris var. ***capillaris***	9	Pink Satin Grass	Very Rare	A few isolated occurrences on the primary dolomite glade
Muhlenbergia frondosa	3	Common Satin Grass	Low	Scattered in riverfront forest along Bryant Creek; identified by Dr. Paul McKenzie
Muhlenbergia mexicana	6	Leafy Satin Grass	Low	Moist dolomite ledges in dry-mesic dolomite woodland
Muhlenbergia schreberi	0	Nimblewill	Moderate	Dense cover in yard, around stable, pasture, log landings, margin of gravel roads
Muhlenbergia sobolifera	4	Rock Satin Grass	High	Scattered in dry and dry-mesic woodlands, dry-mesic forests, dry-mesic bottomland woodlands, upland flatwoods
Muhlenbergia sylvatica	5	Woodland Satin Grass	Low	Isolated in dry sandstone woodland; ledges of moist dolomite forests
Muhlenbergia tenuiflora var. ***tenuiflora***	6	Slender Satin Grass	Rare	Isolated colony along seepy sandstone ledges of steep ravine in mesic sandstone forest [2126]
Panicum anceps var. ***anceps***	3	Beaked Panic Grass	Moderate	Moist depressions in upland flatwoods, muddy dirt road ruts in woodlands, pastures, yard, ditches, gravel washes
Panicum capillare	0	Old Witch Grass	High	Abundant in dolomite glades, rocky openings of dry dolomite woodland, dry rocky roadsides
Panicum flexile	3	Wiry Panic Grass	High	Dolomite glade
Panicum philadelphicum	4	Philadelphia Panic Grass	Low	Widely scattered in sandy openings of riverfront forest, sandbars, dolomite glades
Panicum virgatum	4	Switch Grass	Moderate	Dolomite glade; open dry chert, sandstone, and dolomite woodlands: ROWs
Pascopyrum smithii	0	Western Wheat Grass	Rare	One occurrence on sandbar
Paspalum floridanum var. ***floridanum***	4	Florida Lens Grass	Low	Isolated occurrences on roadsides, mud rut depressions, riverbank, upland flatwoods
Paspalum leave var. ***leave***	3	Smooth Lens Grass	Low	Yard, pastures, log landings, along roadside ROW
Paspalum pubiflorum var. ***glabrum***	3	Hairy-Flowered Lens Grass	Low	Scattered in sandy openings of riverfront forests, sandbars
Paspalum setaceum var. ***muhlenbergii***	3	Hairy Len's Grass	Low	Dolomite glade at powerline cut right-of-way
PHALARIS ARUNDINACEA		Reed Canary Grass	Moderate	Sporadic dense colonies in low sand depressions and slackwater along Bryant Creek. Likely escaped and introduced from upstream pastures where used as forage
PHLEUM PRETENSE		Timothy	Moderate	Isolated but dense colonies in Simpson Pasture, also few log landings, and low places of open gravel washes

POA ANNUA		Annual Blue Grass	Low
Mostly on barren gravelly soil of driveway, yard, gravelly logging roads			
POA COMPRESSA		Canada Blue Grass	High
Simpson Pasture, overgrown fields south side of park, roadsides, yard			
POA PRATENSIS		Kentucky Blue Grass	High
Simpson Pasture, old fields, dry chert woodlands, ROWs			
Poa sylvestris	5	Kentucky Blue Grass	Moderate
Locally common on dry sandstone cliff (ledges), gravel washes, mesic sandstone forests			
Schizachyrium scoparium	5	Little Bluestem	High
Locally abundant on dolomite glade, dry chert and sandstone woodland (especially burned), openings in upland flatwoods, logging road margins, log landings, edge of Simpson Pasture along woodlands			
SETARIA FABERI		Giant Foxtail	Rare
Mostly in yard around house, especially near carport			
SETARIA GLAUCA		Yellow Foxtail	Moderate
Pastures, old fields, disturbed roadsides, yard			
Setaria parviflora	4	Perennial Foxtail	Low
Isolated occurrences in dry chert woodland, edge of logging road, dolomite glade			
SETARIA VIRIDIS var. VIRIDIS		Green Foxtail	Rare
Several plants on gravel bar			
Sorghastrum nutans	4	Indian Grass	Moderate
Scattered on dolomite glades, open dry chert and sandstone woodlands, ROWs, edge of pastures			
SORGHUM HALEPENSE		Johnson Grass	Low
Locally common in pastures, riverfront forests, on gravel bars, ROWs, around stable			
Sphenopholis obtusata var. ***major***	6	Slender Wedge Grass	Low
Dry-mesic chert forest, mesic bottomland forest, gravel wash			
Sporobolus clandestinus	5	Rough Rush Grass	Low
Sparsely scattered in dolomite glade, highway ROW on flatwoods, dry chert woodland			
Sporobolus compositus var. ***compositus***	3	Rough Dropseed	Low
Dolomite glade			
Sporobolus ozarkanus	2	Ozark Dropseed	Moderate
Locally common on dolomite glades and dry dolomite woodlands			
Sporobolus vaginiflorus	0	Sheathed Rough Grass	Low
Scattered over dolomite glade, sandstone glade, and openings in upland flatwoods			
Steinchisma hians	7	Gaping Panic Grass	Rare (S3)
Locally common in water-filled or muddy deep road rut pools on old logging roads [2125]			
Tridens flavus var. ***flavus***	1	False Redtop	Moderate
Scattered in pastures, road ROW, upland old fields south side of park, sparingly in dolomite glades			
Tripsacum dactyloides	5	Gama Grass	Very Rare
One clump found in open gravel wash of dry-mesic bottomland woodland			
VULPIA MYUROS		Mouse-Tail Fescue	Moderate
Locally common in compacted dirt road across Simpson Pasture			

Vulpia octoflora var. ***octoflora***	2	Six-Weeks Fescue	Low
Isolated occurrences in rocky barren patches of dry chert and sandstone woodlands, edges of dry sandstone boulders and ledges			

PONTEDERIACEAE — 1 Taxon

Scientific Name	**C-value**	**Common Name**	**Abundance**
Heteranthera rotundifolia	5	Roundleaf Mud Plantain	Low
Abundant in one artificial pond, few plants in water-filled deep ruts in old logging roads			

POTAMOGENTONACEAE — 2 Taxa

Scientific Name	**C-value**	**Common Name**	**Abundance**
Potamogeton diversifolius	5	Waterthread Pondweed	Moderate
Abundant in two artificial ponds			
Potamogeton foliosus var. ***foliosus***	6	Leafy Pondweed	Very Rare
Small population isolated in stagnant pool of old slough along Bryant Creek			

SMILACACEAE — 3 Taxa

Scientific Name	**C-value**	**Common Name**	**Abundance**
Smilax bona-nox	3	Saw Greenbriar	Moderate
Locally common in dry sandstone and chert woodlands, upland flatwoods, rock shelves of dolomite glades			
Smilax ecirrhata	5	Upright Carrion Flower	Low
Dry-mesic bottomland woodland woodlands and forests, mesic dolomite forests, dolomite talus			
Smilax hispida	3	Bristly Greenbriar	Low
Scattered in dry-mesic to mesic bottomland woodlands, riverfront forests, riverbanks			

TYPHACEAE — 2 Taxa

Scientific Name	**C-value**	**Common Name**	**Abundance**
Typha angustifolia	0	Narrow-Leaved Cattail	Very Rare
One small population in pond next to house			
Typha latifolia	1	Common Cattail	Very Rare
One small population found in stagnant pool of old slough on Bryant Creek			

Dicots — 639 TAXA

ACANTHACEAE — 5 Taxa

Scientific Name	**C-value**	**Common Name**	**Abundance**
Dicliptera brachiata	6	Wild Mudwort	Rare
Several plants on seepy ledges of riverbank along Bryant Creek			
Justicia americana	5	Water Willow	Moderate
Locally common where stabilizing gravel bars and gravel banks of Bryant Creek			
Ruellia humilis	3	Hairy Ruellia	Low
Scattered on dolomite glades, open dry chert woodlands, roadside ROWs			

Ruella pedunculata	5	Wild Petunia	Low
Locally in dry dolomite woodlands and Hwy ROW			
Ruella strepens	3	Smooth Ruellia	Low
Dry-mesic dolomite forest and mesic bottomland forest			

AMARANTHACEAE — 4 Taxa

Scientific Name	**C-value**	**Common Name**	**Abundance**
Amaranthus albus	0	Tumbleweed	Rare
Isolated on gravel bars			
AMARANTHUS SPINOSUS		Thorny Amaranth	Low
Scattered on gravel bars in in open sandy riverfront forests			
Froelichia gracilis	3	Small Cottonweed	Low
Widely scattered on gravel bars, on Hwy road margin			
Iresine rhizomatosa	5	Bloodleaf	Moderate
Scattered in riverfront forests, riverbanks			

ANACARDIACEAE — 7 Taxa

Scientific Name	**C-value**	**Common Name**	**Abundance**
Cotinus obovatus	9	American Smoke Tree	Low
Small isolated population confined to dry dolomite woodlands and ledges along the northern extent of the park's graben [2119]			
Rhus aromatica var. ***aromatica***	4	Common Fragrant Sumac	Moderate
Scattered on dolomite glade under red cedar, dry dolomite woodlands, dry chert and sandstone woodlands, upland flatwoods, especially south of Hwy N in openings			
Rhus aromatica var. ***serotina***	6	Tall Fragrant Sumac	Low
Dolomite glades, rocky exposed dry sandstone woodlands			
Rhus copallinum	2	Shining Sumac	Moderate
Especially abundant throughout dry sandstone and chert woodlands in response to past wildfires and prescribed burn; scattered elsewhere including old fields, pasture, logging roads and landings			
Rhus glabra	1	Smooth Sumac	Moderate
Abundant throughout dry sandstone and chert woodlands, pasture, log landings			
Toxicodendron pubescens	7	Eastern Poison Oak	Very Rare
Isolated on exposed open dry chert knob along Hwy N			
Toxicodendron radicans	1	Poison Ivy	Moderate
Scattered throughout most natural communities; especially abundant in dry-mesic woodlands and dry-mesic to mesic forests, also along riverbanks, pastures, gravel washes			

ANNONACEAE — 1 Taxon

Scientific Name	**C-value**	**Common Name**	**Abundance**
Asimina triloba	5	Pawpaw	Moderate
Scattered to isolated in lower elevations of dry-mesic to mesic woodlands, forests, moist dolomite cliff ledges, dolomite talus, riverfront forests, mesic bottomland forests			

APIACEAE — 20 Taxa

Scientific Name	C-value	Common Name	Abundance
Angelica venenosa	8	Wood Angelica	Low
Occasional in dry and dry-mesic chert woodlands, dry-mesic chert and sandstone forests, dry-mesic dolomite woodland, upland flatwoods			
Chaerophyllum tainturieri	3	Wild Chervil	Moderate
Dry-mesic chert forests, dry-mesic bottomland forests, mesic dolomite forest, dry-mesic and mesic bottomland forests and woodlands, upland pastures			
Cicuta maculata var. ***maculata***	5	Water Hemlock	Rare
Scattered in spicebush seep forest and moist dolomite cliff (ledges)			
CONIUM MACULATUM		Poison Hemlock	Low
Disturbed soil from logging operations in dry sandstone woodland and where logging road intersects dry-mesic bottomland woodland on south side of park			
Cryptotaenia canadensis	2	Honewort	Moderate
Dolomite talus, dry-mesic and mesic bottomland forests (including valley terraces), dry-mesic bottomland woodland, gravel washes			
DAUCUS CAROTA subsp. CAROTA		Queen Anne's Lace	Moderate
Dry chert and sandstone woodland, pastures, road ROWs, long landings, dolomite glades			
Erigenia bulbosa	6	Harbinger of Spring	Moderate
Scattered in mesic bottomland forests, riverfront forests			
Eryngium prostratum	5	Creeping Coyote Thistle	Very Rare
Few plants isolated in mud ruts of logging road in upland flatwoods [2134]			
Eryngium yuccifolium	8	Rattlesnake Master	Low
Widely scattered in dry chert and sandstone woodlands mostly south of Hwy N, also in upland flatwoods			
Osmorhiza longistylis	3	Smooth Sweet Cicely	Moderate
Scattered through dry-mesic chert and dolomite forest, common in mesic dolomite forest and dolomite talus, and in mesic bottomland forests			
Oxypolis rigidior	7	Combane	Low
Ozark fen, ravine side slope seeps, seepy ledges of moist dolomite cliffs			
Polytaenia nuttallii	8	Prairie Parsley	Very Rare
Small population isolated on dolomite glade			
Sanicula canadensis	3	Canadian Snake Root	Moderate
Dry sandstone woodland, mesic sandstone and dolomite forest, mesic bottomland forest			
Sanicula odorata	2	Clustered Black Snakeroot	Rare
Mesic dolomite forest and dolomite talus			
Sium suave	6	Water Parsnip	Very Rare
Spicebush terrace seeps and mesic dolomite forest			
Taenidia integerrima	6	Yellow Pimpernel	Low
Dry and dry-mesic dolomite woodland, dry-mesic forest			
Thaspium trifoliatum var. ***flavum***	6	Yellow Meadow Parsnip	Low
Widely scattered in dry mesic dolomite woodland			

TORILIS JAPONICA		Japanese Hedge Parsley	Rare
Road ROW			
Zizia aptera	7	Heart-Leaved Meadow Parsnip	Low
Several scattered plants Isolated along gravel wash in Major Hollow			
Zizia aurea	5	Golden Alexanders	Low
Widely scattered in dry sandstone, chert, dolomite woodland; dry-mesic dolomite woodland, mesic dolomite forest, dry-mesic bottomland woodland, upland flatwoods			

APOCYNACEAE — 3 Taxa

Scientific Name	**C-value**	**Common Name**	**Abundance**
Amsonia illustris	7	Shining Blue Star	Rare
Restricted to Hwy roadside in ditches over dolomite glade and open dry chert woodland			
Apocynum cannabinum	3	Prairie Dogbane	Low
Scattered in dry sandstone and chert woodlands, upland flatwoods, dolomite glade, Ozark fen, dolomite spring, and Hwy ROW			
VINCA MINOR		Common Periwinkle	Very Rare
Scattered along back of house			

AQUIFOLIACEAE — 1 Taxon

Scientific Name	**C-value**	**Common Name**	**Abundance**
Ilex decidua	5	Possum Haw	Low
Dry dolomite woodlands, dry-mesic bottomland woodland, glades			

ARALIACEAE — 1 Taxon

Scientific Name	**C-value**	**Common Name**	**Abundance**
Panax quinquefolius	8	Ginseng	Rare
Isolated occurrences in mesic sandstone, dolomite forests, dolomite talus, spicebush terrace seeps			

ARISTOLOCHIACEAE — 3 Taxa

Scientific Name	**C-value**	**Common Name**	**Abundance**
Asarum canadense	6	Wild Ginger	Moderate
Locally common in mesic sandstone and dolomite forests, dry-mesic dolomite forests, mesic bottomland woodland, dolomite talus, ledges of moist dolomite cliffs			
Endodeca serpentaria	6	Virginia Snakeroot	Low
Widely scattered in dry-mesic chert and sandstone woodlands and forests			
Isotrema tomentosa	7	Pipe-Vine	Low
Scattered along riverbanks of Bryant Creek where climbing in low trees			

ASCLEPIADACEAE — 7 Taxa

Scientific Name	**C-value**	**Common Name**	**Abundance**
Asclepias purpurascens	6	Purple Milkweed	Low
Widely scattered in low drainages of open dry and dry-mesic chert woodlands, especially south of Hwy N, along Hwy N ROW			

Asclepias quadrifolia	6	Four-Leaved Milkweed	Low
Scattered in dry and dry-mesic chert woodland, upland flatwoods			
Asclepias tuberosa subsp. ***interior***	5	Butterfly Weed	Low
Scattered in dry and dry-mesic chert woodlands, dry-mesic chert forest, Hwy ROWs			
Asclepias verticillata	2	Whirled Milkweed	Low
Widely scattered in dry and dry-mesic chert woodlands, dolomite glade, Ozark fen			
Asclepias viridiflora	7	Short Green Milkweed	Low
Sparse on dolomite glades, dry dolomite woodlands			
Asclepias viridis	5	Green-Flowered Milkweed	Low
Dolomite glades, dry chert woodlands, Hwy ROW			
Matelea decipiens	5	Climbing Milkweed	Low
Sparse on dolomite glade, dry dolomite woodlands, gravel washes			

ASTERACEAE — 131 Taxa

Scientific Name	C-value	Common Name	Abundance
ACHILLEA MILLEFOLIUM		Yarrow	Moderate
Scattered to common in pastures, roadsides, log landings, sparse on glades			
Ageratina altissima	2	White Snakeroot	Moderate
Locally common in dry and dry-mesic chert woodlands (particularly disturbed by past logging), log landings, upland flatwoods, Mesic dolomite forest, mesic talus, riparian forest			
Ambrosia artemisiifolia	0	Common ragweed	Moderate
Locally common in open disturbed soils of dry and dry-mesic sandstone, chert woodlands, upland flatwoods, open logging roads, Hwy roadsides, pastures, gravel washes			
Ambrosia bidentata	0	Southern ragweed	Low
Open disturbed soil of dry sandstone woodlands, upland flatwoods, riverfront forests, logging roads, pasture, edge of Hwy ROW			
Ambrosia trifida	0	Giant Ragweed	Low
Occasional in riverfront forests, riverbanks, gravel washes			
Antennaria parlinii	5	Pussy's Toes	Moderate
Locally common in dry chert and sandstone woodlands, dry sandstone ledges, upland flatwoods, dolomite glades			
Arnoglossum atriplicifolium	4	Pale Indian Plantain	Moderate
Locally common on mesic bottomland forests on small stream terraces, dry-mesic chert and sandstone forests, dry-mesic bottomland woodland, gravel washes			
Arnoglossum plantagineum	8	Prairie Indian Plantain	Very Rare
Isolated occurrences edge of Ozark fen and dolomite glade			
ARTEMISIA ANNUA		Sweet Wormweed	Low
Scattered in riverfront forest, gravel bars, sandbars			
Bidens aristosa	1	Swamp Marigold	Low
Scattered in open sandy riverfront forests, riverbanks, gravel bars, edges of sloughs, pastures			
BIDENS BIPINNATA		Spanish Needles	Low
Scattered in riverfront forests, gravel bars, gravel washes, disturbed areas, log landings			

Bidens cernua	5	Nodding Bur Marigold	Low
Isolated along mud flats, riverbanks, sloughs			
Bidens connata	3	Purple-Stemmed Tickseed	Low
Gravel bar			
Bidens frondosa	2	Common Beggar's Ticks	High
Along riverbanks, edge of sloughs, scattered in riverfront forests, edge of ponds			
Bidens vulgata	1	Tall Beggar's Ticks	Low
Along stagnant pool in filled slough			
Bradburia pilosa	3	Soft-Golden Aster	High
Dry chert and sandstone woodland, upland flatwoods, along logging roads, ROWs			
Brickellia eupatorioides var. ***texana***	7	Ozark False Boneset	Low
Dolomite glade, dry dolomite woodland, dry dolomite cliff			
CARDUUS NUTANS		Musk Thistle	Rare
Few scattered in Simpson Pasture, also along gravel road			
CENTAUREA STOEBE subsp. MICRANTHOS		Spotted Knapweed	Low
Dry dolomite woodland, scattered in upland pasture, Hwy ROW, logging roads			
CICHORIUM INTYBUS		Chickory	Low
Scattered along Hwy ROW, logging road edge, log landings			
Cirsium altissimum	4	Tall Thistle	Low
Scattered in upland flatwoods, dry and dry-mesic chert woodland, dry-mesic bottomland forests, dry-mesic bottomland woodland, riverbanks			
CIRSIUM VULGARE		Bull Thistle	Low
Pastures, around stable, along gravel road, Hwy ROW, logging road, log landing			
Conoclinum coelestinum	3	Mistflower	Low
Scattered along riverbanks, top of talus boulders along edge of Bryant Creek			
Conyza canadensis var. ***canadensis***	0	Horseweed	Moderate
Pasture, around stable, along gravel roads, logging roads, log landing			
Coreopsis lanceolata	5	Sand Coreopsis	Moderate
Scattered in dry chert, sandstone and dolomite woodland, dolomite glades; more abundant along edge of logging roads south side of Highway N			
Coreopsis palmata	7	Prairie Coreopsis	Low
Dolomite glade, dry chert and sandstone woodland,			
Coreopsis pubescens var. ***pubescens***	7	Star Tickseed	Low
Widely scattered on dolomite glades, dry-mesic chert and dolomite woodland, dry-mesic bottomland woodland, gravel washes, riverbanks.			
Coreopsis tinctoria	1	Golden Coreopsis	Rare
Isolated in sandy openings of riverfront forests along Bryant Creek			
Coreopsis tripteris	6	Tall Coreopsis	Low
Scattered along edge of Ozark fen, Hwy ROW, along dolomite spring			
Echinacea pallida	7	Pale Purple Coneflower	Rare
Dry chert woodland, dry dolomite cliff edge, upland pasture			
Echinacea purpurea	5	Purple Coneflower	Very Rare
One plant found flowering along gravel wash in dry-mesic bottomland woodland			

Echinacea simulata	7	Glade Purple Coneflower	Low	Scattered across open dolomite glades
Eclipta prostrata	3	Yerb De Tajo	Low	Sparse along edges of mudflats, muddy embankments, sloughs
Elephantopus carolinianus	3	Elephant's Foot	Moderate	Gravel openings in riverfront forests, gravel washes, edge of gravel roads
Erectites hieracifolius	1	Fireweed	Low	Scattered in recently burned open dry chert and sandstone woodlands; also widely scattered in upland flatwoods, soils disturbed by logging operations, pasture, and yard
Erigeron annuus	1	Annual Fleabane	Low	Isolated occurrences in dry and dry-mesic sandstone/chert woodlands, upland flatwoods, edges of logging roads, gravel washes, roadside ROW
Erigeron philadelphicus	3	Marsh Fleabane	Low	Isolated along edge of main logging road near glade
Erigeron pulchellus var. ***pulchellus***	6	Robin's Plantain	Low	On exposed mossy banks of small drainages over sandstone and chert; mesic bottomland forests on small stream terraces, dry-mesic bottomland woodlands
Erigeron strigosus var. ***strigosus***	3	Daisy Fleabane	High	Locally common on dolomite glade, dry chert and sandstone woodlands, upland flatwoods, gravel washes, along logging roads, pastures, roadside ROWs.
Eupatorium altissimum	3	Tall Boneset	Low	Scattered in dry sandstone woodlands, upland flatwoods, pastures, logging roads
Eupatorium purpureum	6	Purple Joe Pye Weed	Low	Occasional in mesic dolomite forests, dolomite talus, mesic bottomland forests
Eupatorium serotinum	1	Late Boneset	Low	Occasional in upland flatwoods, pasture, dry chert woodlands, roadsides
Eupatorium sessilifolium	7	Upland Boneset	Rare	Colony of plants confined to dry chert woodlands in prescribed burn area [2128]
Gamochaeta argyrinea	2	Southern Cudweed	Low	Widely scattered across dry chert and sandstone woodlands, upland flatwoods, edge of old logging roads, pond embankment
Grindelia lanceolata	3	Spiny-Toothed Gumweed	Low	Scattered on dolomite glade, along logging roads
HELENIUM AMARUM var. AMARUM		Bitterweed	High	Locally common in pastures, along logging roads, log landings, Hwy ROWs
Helenium autumnale	5	Sneezeweed	Very Rare	Sparse in Ozark fen
Helianthus hirsutus	3	Oblong Sunflower	High	Locally common in dry and dry-mesic woodlands, upland flatwoods, Hwy ROWs
Helianthus strumosus	7	Pale-Leaved Sunflower	Very Rare	Few plants restricted to low moist pine-dominated flatwoods south of Hwy N
Helianthus tuberosus	3	Jerusalem Artichoke	Rare	Small population along eroded bank of Bryant Creek

Heliopsis gracilis	5	False Sunflower	Low
Isolated occurrences in dry chert and dolomite woodlands, dry-mesic bottomland woodlands, gravel washes			
Heliopsis helianthoides var. ***helianthoides***	5	False Sunflower	Moderate
Scattered in dry and dry-mesic chert and dolomite woodlands, dry-mesic bottomland woodlands, dolomite glades, riverbanks			
Heterotheca camporum var. ***camporum***	1	Narrow-Leaved Golden Aster	Low
Scattered in open dry chert- sandstone woodlands, along logging roads south of Hwy N			
Hieracium gronovii	4	Hairy Hawkweed	Moderate
Widely scattered over dry and dry-mesic sandstone and chert woodlands			
Ionactis linariifolius	9	Flax-Leaved Aster	Low
Local occurrences in dry chert and sandstone woodlands			
Krigia biflora var. ***biflora***	5	Orange False Dandelion	Moderate
Scattered across all woodlands and dry-mesic forests, glades, upland flatwoods			
Krigia caespitosa subsp ***caespitosa***	2	Opposite-Leaved Dandelion	Moderate
Locally common along center and edges of logging roads, pastures, log landings			
Krigia virginica	3	Common Dwarf Dandelion	Low
Dry chert, sandstone, dolomite woodlands; dry sandstone ledges, upland flatwoods, sandstone glade			
Lactuca canadensis	3	Wild Lettuce	Low
Occasional in dry chert and sandstone woodland			
Lactuca floridana	3	Blue Lettuce	Low
Dry-mesic chert forests, dry-mesic and mesic dolomite forests, dolomite talus, moist dolomite cliff (ledges), mesic bottomland forests			
Lactuca hirsuta	4	Hairy Lettuce	Rare (SU)
Isolated occurrences in dry chert and sandstone woodlands, and upland flatwoods			
LACTUCA SALIGNA		Willow Lettuce	Very Rare
One population restricted to gravelly edge of Hwy N			
LACTUCA SERRIOLA		Prickly Lettuce	Rare
Few plants found in open upland (logged) flatwoods south of Hwy N			
LEUCANTHEMUM VULGARE		Ox-Eye Daisy	Low
Scattered in disturbed areas of logging roads, pastures, yard, along gravel roads, Hwy N ROW			
Liatris aspera	6	Rough Blazing Star	Low
Scattered on dolomite glades and dry chert woodlands			
Liatris cylindracea	7	Cylindrical Blazing Star	Moderate
Locally common on dolomite glades, dry dolomite cliff tops, dry open chert woodlands			
Liatris pycnostachya var. ***pycnostachya***	6	Prairie Blazing Star	Rare
Found only in Ozark fens			
Liatris squarrosa var. ***squarrosa***	6	Scaly Blazing Star	Low
Scattered in open dry chert woodlands and upland flatwoods			
Matricaria discoidea		Pineapple Weed	Very Rare
Few plants along driveway at house only			

Nabalus altissimus	5	Tall White Lettuce	Low	Along moist sandstone ledges, mesic sandstone forests
Oligoneuron album	9	Stiff Aster	VR	Local population isolated at edge of Ozark fen on open chert woodland
Packera aurea	7	Common Golden Ragwort	Moderate	Locally abundant along seepy slopes of sandstone ravines, Ozark fens, dolomite springs
Packera obovata	4	Round-Leaved Ragwort	Moderate	Locally common in dry-mesic dolomite woodland, dry-mesic bottomland forests, along gravel washes and adjacent terraces
Palafoxia callosa	5	Small Palafoxia	Low	Dolomite glades
Parthenium hispidum	9	Hairy Feverfew	Low	Locally common in one location on dolomite glade
Parthenium integrifolium	6	Quinine	Low	Cherty areas on dolomite glade, open dry chert and sandstone woodlands, in utility line ROWs, edge of pasture in cherty soil, openings of upland flatwoods
Polymnia canadensis	6	Leafcup	Low	Scattered and restricted to dolomite talus slopes, moist dolomite cliff ledges
Pseudognaphalium obtusifolium	2	Old-Field Balsam	Low	Scattered in open dry chert and sandstone woodlands especially south of Hwy N, pastures
Pyrrhopappus carolinianus	0	Yellow False Dandelion	Low	Isolated in log landings, edge of logging roads south of Hwy N
Ratibida pinnata	4	Grey-Headed Coneflower	Moderate	Locally common in dry chert and sandstone woodlands, along logging roads, Hwy ROWs
Rudbeckia fulgida var. ***palustris***	7	Orange Coneflower	Rare	Sparse occurrences in Ozark fens, along dolomite springs, in spicebush terrace seeps, and seepy dolomite ledges along riverbank of Bryant Creek
Rudbeckia hirta var. ***pulcherrima***	1	Black-Eyed Susan	Moderate	Scattered through dry chert, sandstone and dolomite woodlands, dolomite glades, upland flatwoods, roadsides, logging roads, pastures, yard.
Rudbeckia laciniata var. ***laciniata***	4	Wild Golden Glow	High	Locally common throughout riverfront forests, mesic bottomland forests, lower valley gravel washes, riverbanks
Rudbeckia missouriensis	6	Missouri Black-Eyed Susan	Moderate	Locally abundant on dolomite glades, dry dolomite woodlands, dolomite outcrops, top of dry dolomite cliffs
Rudbeckia triloba	3	Brown-Eyed Susan	Moderate	Primarily low elevations in gravelly drainages, gravel washes, riverfront forests, riverbanks, gravel bars, disturbed areas including log landings and along logging roads
Silphium asteriscus var. ***asteriscus***	7	Starry Rosinweed	Low	Occasional in dry and dry-mesic chert woodlands, and ledges on dry dolomite cliff
Silphium integrifolium var. ***integrifolium***	4	Rosinweed	Very Rare	One occurrence on dolomite glade

Silphium laciniatum	6	Compass Plant	Rare	Widely scattered on dolomite glades
Silphium perfoliatum	3	Cup Plant	Very Rare	Seen in two instances; one plant on moist dolomite cliff ledge; several plants on riverbank in giant cane
Silphium terebinthinaceum	5	Prairie Dock	Rare	Widely scattered on dolomite glades
Smallanthus uvedalius	8	Yellow-Flowered Leafcup	Very Rare	Few plants seen along Hwy ROW; few plants on edge of Simpson Pasture
Solidago altissima var. ***altissima***	1	Tall Goldenrod	Low	Scattered populations in pasture, Hwy ROW, and spicebush terrace seep
Solidago arguta	7	Sharp-Leaved Goldenrod	Moderate	Scattered in dry and dry-mesic chert woodlands, along dry sandstone ledges, moist dolomite ledges, upland flatwoods, and gravel wash embankments.
Solidago buckleyi	8	Buckley's Goldenrod	Rare	Dry-mesic sandstone woodlands and forests, dry dolomite woodland around ledges
Solidago caesia	7	Blue-Stemmed Goldenrod	Moderate	Mesic sandstone and dolomite forests, along rocky permanent streams in deep valleys, moist sandstone and dolomite cliffs, dolomite talus slopes, boulders and ledges along Bryant Creek riverbank
Solidago drummondii	8	Drummond's Goldenrod	Low	Dry dolomite cliffs and ledges
Solidago gigantea	3	Late Goldenrod	Low	Scattered in riverfront forests; locally common along stable riverbanks
Solidago hispida var. ***hispida***	6	White Goldenrod	Low	Widely scattered in dry chert and sandstone woodlands, dry sandstone ledges
Solidago juncea	4	Early Goldenrod	Moderate	Scattered in dry chert and sandstone woodland; colonial basal rosettes scattered in upland flatwoods south of Hwy N
Solidago nemoralis var. ***longipetiolata***	2	Old-Field Goldenrod	Low	Scattered in dry chert, sandstone, and dolomite woodlands, dolomite glades
Solidago nemoralis var. ***nemoralis***	2	Old-Field Goldenrod	Low	Scattered in dry chert, sandstone, dolomite woodlands, upland flatwoods, along logging roads, old fields, ROWs.
Solidago petiolaris	8	Downy Goldenrod	Low	Scattered in open dry chert and sandstone woodlands, dry sandstone cliff ledges
Solidago radula	6	Rough Goldenrod	Low	Scattered in open dry chert and sandstone woodlands, along dry dolomite ledges
Solidago rigida	5	Stiff Goldenrod	Very Rare	Isolated along edge of dolomite glade
Solidago rugosa subsp. ***rugosa***	6	Rough-Leaved Goldenrod	Rare	Isolated population in low moist open upland flatwoods, in Ozark fen, open spicebush terrace seep

Solidago ulmifolia	4	Elm-Leaved Goldenrod	High	Dry-mesic upland forests, dry and dry-mesic sandstone and dolomite woodlands, mesic dolomite forests, moist dolomite cliffs
SONCHUS ASPER subsp. ASPER		Spiny Sow Thistle	Rare	Few plants isolated in moist opening of upland flatwoods south of Hwy N
Symphyotrichum anomalum	7	Blue Aster	Low	Dry and dry-mesic chert, sandstone, dolomite woodland, upland flatwoods, dry-mesic bottomland woodland
Symphyotrichum cordifolium	4	Heart-Leaved Aster	Low	Along moist sandstone ledges, mesic dolomite forests, moist dolomite cliff, dolomite talus, stable rocky riverbanks
Symphyotrichum laeve	7	Smooth Blue Aster	Low	Scattered on dolomite glades, dry dolomite woodland, open dry chert woodlands, Ozark fen
Symphyotrichum lanceolatum var. ***lanceolatum***	3	Panicled Aster	Low	Scattered sparingly along edges of slackwater mudflats, open slough edges, riverbanks
Symphyotrichum lateriflorum	3	Side-Flowering Aster	Moderate	Moist or seepy soil of mesic sandstone forests, spicebush terrace seeps, ravine side slope seeps, edges of valley streams, dolomite spring branches, moist dolomite cliff ledges, seepy ledges along riverbanks, Ozark fens
Symphyotrichum oblongifolium	6	Aromatic Aster	Low	Rocky ledges of dolomite glades, open rocky dolomite woodlands, dry dolomite cliffs
Symphyotrichum oolentangiense	7	Azure Aster	Low	Dolomite glades, open dry chert woodlands especially south of Hwy N
Symphyotrichum patens	5	Spreading Aster	Low	All dry woodlands, upland flatwoods
Symphyotrichum pilosum var. ***pilosum***	0	Hairy Aster	Moderate	Scattered in open chert and sandstone woodlands, upland flatwoods, disturbed soils of log landings and heavily logged woodlands; locally common in pastures, along gravel roads, Hwy ROW, eroded riverbanks.
Symphyotrichum pilosum var. ***pringlei***	2	Hairy Aster	Low	Widely scattered on dolomite glades and open dry chert woodlands
Symphyotrichum praealtum	6	Willow Aster	Very Rare	Small population in low moist opening of upland flatwoods south of Hwy N
Symphyotrichum sericeum	9	Silky Aster	Very Rare	Isolated on dolomite glade; more numerous on dolomite glade on knob east Hwy N
Symphyotrichum turbinellum	6	Prairie Aster	Very Rare	Isolated occurrences on dry chert and sandstone woodlands south of Hwy N; few on upland flatwoods
Symphyotrichum urophyllum	4	Arrow-Leaved Aster	Moderate	Mostly on rocky ledges, boulders, talus slopes along riverbank of Bryant Creek
TARAXACUM ERYTHROSPERMUM		Red-Seeded Dandelion	Very Rare	One plant found on gravel bar

TARAXACUM OFFICINALE		Common Dandelion	Low
Scattered in yard, pastures, roadsides, log landings			
Verbesina alternifolia	4	Wingstem	Moderate
Scattered in riverfront forest and along riverbanks			
Verbesina helianthoides	5	Yellow Crownbeard	Moderate
Scattered in dry chert and sandstone woodland, mostly south of Hwy N			
Verbesina virginica var. ***virginica***	5	White Crownbeard	High
Scattered in riverfront forests, riverbanks, pastures, roadsides, dry woodlands			
Vernonia arkansana	7	Great Ironweed	Very Rare
Isolated on dolomite glades, Ozark fen, gravel bars			
Vernonia baldwinii	2	Western Ironweed	Moderate
Widely scattered in upland flatwoods, dry chert and sandstone woodlands, Hwy ROW, pastures, along logging roads, gravel washes			
Vernonia gigantea var. ***gigantea***	6	Tall Ironweed	Rare
Few isolated occurrences along riverbank of Bryant Creek			
Xanthium speciosum	0	Cocklebur	High
Locally common in sandy openings of riverfront forests, sandbars and gravel bars of Bryant Creek			
Xanthium strumarium	0	Cocklebur	Low
Scattered on gravel bars of Bryant Creek			

BALSAMINACEAE — 2 Taxa

Scientific Name	**C-value**	**Common Name**	**Abundance**
Impatiens capensis	3	Orange Jewelweed	Moderate
Locally common in spicebush terrace seeps, ravine side slope seeps in mesic sandstone forests, along moist dolomite cliffs and ledges, dolomite springs, shaded permanent streambanks of deep headwater valleys			
Impatiens pallida	5	Yellow Jewelweed	Low
Confined to a few populations along mesic dolomite forests and dolomite talus			

BERBERIDACEAE — 2 Taxa

Scientific Name	**C-value**	**Common Name**	**Abundance**
Caulophyllum thalictroides	8	Blue Cohosh	Moderate
Locally common in mesic dolomite forests and dolomite talus slopes at the base of moist dolomite cliffs			
Podophyllum peltatum	4	May Apple	High
Locally common on mesic bottomland forests of stream terraces, dry-mesic chert and sandstone forests, dry-mesic and mesic bottomland forests, riverfront forests			

BETULACEAE — 3 Taxa

Scientific Name	**C-value**	**Common Name**	**Abundance**
Carpinus caroliniana	6	Blue Beech	Low
Locally common at base of dolomite talus on riverbank of Bryant Creek, along valley gravel washes, mesic dolomite forests, riverfront forests, dry-mesic sandstone forests			

Corylus americana	4	American Hazelnut	Low
Widely scattered in open chert and sandstone woodlands south of Hwy N, along mesic bottomland forests of stream terraces, gravel washes			
Ostrya virginiana	4	Ironwood	Moderate
Scattered understory tree in dry-mesic to mesic forests, along dry cliff edges, dry dolomite woodlands			

BIGNONIACEAE — 1 Taxon

Scientific Name	**C-value**	**Common Name**	**Abundance**
Campsis radicans	3	Trumpet Creeper	Low
Scattered along riverbanks, gravel washes, on cliff faces, cliff edges, riverfront forests			

BORAGINACEAE — 4 Taxa

Scientific Name	**C-value**	**Common Name**	**Abundance**
Hackelia virginana	3	Stickseed	Rare
Isolated in dry sandstone and chert woodlands, dry-mesic bottomland woodlands, gravel washes			
Lithospermum canescens	6	Hoary Puccoon	Low
Scattered in dolomite glades and dry rocky dolomite woodlands; sparingly in open dry chert woodlands and dry dolomite cliff edges			
Myosotis verna	2	Spring Forget-Me-Not	Rare
Isolated around yard, pasture, stable			
Onosmodium molle subsp. ***subsetosum***	4	Ozark False Gromwell	Very Rare
Glade openings in dry dolomite woodlands			

BRASSICACEAE — 17 Taxa

Scientific Name	**C-value**	**Common Name**	**Abundance**
ARABIDOPSIS THALIANA		Mouse-Ear Cress	Rare
Scattered sparingly around yard and pasture [2104]			
BARBAREA VULGARIS		Yellow Rocket	Low
Scattered in disturbed habitats including yard, pastures, roadsides, log landings, gravel washes, gravel bars			
Boechera canadensis	4	Sickle Pod	Low
Widely scattered on dolomite glades, glade openings in dry dolomite woodlands			
Boechera laevigata	6	Smooth Bank Cress	Low
Scattered in dry-mesic dolomite woodlands and forests, mesic dolomite forests, moist dolomite cliff ledges, dolomite talus			
CAPSELLA BURSA-PASTORIS		Sheperd's Purse	Low
Widely scattered in yard, along gravel road, and around stable			
Cardamine bulbosa	7	Bulbous Cress	Low
Locally common in mesic sandstone forests, particularly deep ravines and moist to wet ledges of sandstone waterfalls, spicebush terrace seeps, along seep-fed streams, dolomite springs, cool-shaded slough edges			

Cardamine concatenata	4	Toothwort	Moderate
Locally common in dry-mesic chert, sandstone, and dolomite forests, mesic sandstone and dolomite forests, dry-mesic chert woodlands, mesic bottomland forests, moist dolomite cliff ledges			
Cardamine parviflora var. ***arenicola***	3	Small-Flowered Bitter Cress	Low
Scattered in yard, pasture, roadsides, along logging roads, disturbed soil of old log landings, dry and dry-mesic chert woodlands			
Cardamine pensylvanica	6	Pennsylvania Bitter Cress	Rare
Moist sandstone ledge and around stable			
Draba cuneifolia var. ***cuneifolia***	5	Wedgeleaf Draba	Very Rare
Few isolated populations on dolomite glades			
Leavenworthia uniflora	7	Michaux's Leavenworthia	Rare
Widely scattered on wet dolomite flatrock depressions and low seepy rock shelves on dolomite glades			
LEPIDIUM CAMPESTRE		Field Cress	Rare
Several plants along Hwy ROW next to gated gravel road to glade			
Lepidium virginicum	0	Common Pepper Cress	Low
Widely scattered along edges of gravel roads and Hwy ROW			
MICROTHLASPI PERFOLIATUM		Perfoliate Pennycress	Very Rare
Few scattered plants isolated next to stable only			
NASTURTIUM OFFICINALE		Water Cress	Rare
Restricted to dolomite spring run at logging road culvert crossing by glade			
Rorippa sessiliflora	3	Sessile-Flowered Cress	Rare
Few widely scattered plants in sandy openings of riverfront forests			
SISYMBRIUM LOESELII		Tall Hedge Mustard	Very Rare
Several plants confined to edge of porch behind house			

CACTACEAE — 1 Taxon

Scientific Name	**C-value**	**Common Name**	**Abundance**
Opuntia humifusa	4	Eastern Prickly Pear	Very Rare
Several isolated occurrences on glades, and Hwy N ROW			

CAMPANULACEAE — 8 Taxa

Scientific Name	**C-value**	**Common Name**	**Abundance**
Campanula americana	4	Tall Bellflower	Low
Scattered in dry-mesic and mesic dolomite forest, dry-mesic dolomite woodland, moist dolomite cliff (ledges), dolomite talus, mesic bottomland forest			
Lobelia cardinalis	6	Cardinal Flower	Low
Scattered along riverbanks			
Lobelia inflata	3	Indian Tobacco	Low
Dry-mesic chert woodland, mesic sandstone forest, dry-mesic dolomite woodlands and forests, dry sandstone cliffs (ledges)			

Lobelia siphilitica	4	Great Blue Lobelia	Low
Scattered along dolomite spring runs, Spicebush terrace seeps, seepy ledges along sandstone ravines, riverbanks			
Lobelia spicata	5	Pale Spiked Lobelia	Low
Scattered in dry and dry-mesic chert, sandstone, dolomite woodlands; dolomite glades, upland flatwoods			
Lobelia* X *speciosa	6	Tania hybrid form	Very Rare
Hybrid between *Lobelia cardinalis* and *L. siphilitica* growing on dolomite ledges along riverbanks of Bryant Creek			
Triodanis biflora	3	Small Venus' Looking Glass	Low
Widely scattered along gravel road and in Simpson Pasture			
Triodanis perfoliata	2	Perfoliate Venus' Looking Glass	Low
Upland flatwoods, dry chert and sandstone woodlands, pastures, along roadsides			

CANNABACEAE — 1 Taxon

Scientific Name	C-value	Common Name	Abundance
HUMULUS LUPULUS var. LUPULUS		European Hop	Rare
Isolated along eroding dirt embankments along Bryant Creek			

CAPRIFOLIACEAE — 8 Taxa

Scientific Name	C-value	Common Name	Abundance
Lonicera flava	7	Yellow Honeysuckle	Moderate
Locally common in upland flatwoods, dry sandstone and chert woodlands, dry-mesic sandstone woodlands, along dry-sandstone cliffs and ledges; no flowering plants due to near elimination by deer in summer			
LONICERA JAPONICA		Japanese Honeysuckle	Low
Scattered in isolated locations in pastures, roadsides, fencerows, yard			
Sambucus canadensis	2	Elderberry	Moderate
Locally common in dry-mesic bottomland woodland, gravel washes, riverbanks along Bryant Creek; scattered in dolomite talus and mesic dolomite forests, along ledges of moist dolomite cliffs			
Symphoricarpos orbiculatus	1	Coralberry	Moderate
Locally common in upland flatwoods, ridgetops of dry sandstone and chert woodlands, dry-mesic bottomland woodlands, pastures			
Triosteum angustifolium	6	Yellow-Flowered Horseweed	Very Rare
Small population confined to rocky drainage of dry-mesic dolomite woodland			
Viburnum molle	8	Arrow-Wood	Rare (SU)
Widely scattered along moist dolomite cliff ledges and dolomite talus [2107]			
Viburnum prunifolium	4	Black Haw	Low
Widely scattered in mesic dolomite forests, mesic bottomland forests, and dolomite talus			
Viburnum rufidulum	4	Southern Black Haw	Low
Widely scattered along edges of dolomite glades, dry dolomite woodland, dry chert woodlands, dry-mesic bottomland woodlands, gravel washes			

CARYOPHYLLACEAE — 11 Taxa

Scientific Name	C-value	Common Name	Abundance
CERASTIUM BRACHYPETALUM		Gray Chickweed	Very Rare
Several plants isolated in driveway of house			
CERASTIUM GLOMERATUM		Clammy Chickweed	Low
Scattered locally in upland flatwoods, along gravel road, yard, pasture			
Cerastium nutans subsp. ***nutans***	2	Nodding Chickweed	Low
In moss cover of moist sandstone bedrock along headwater drainage, upland flatwoods, dry sandstone cliff ledges			
DIANTHUS ARMERIA subsp. ARMERIA		Deptford Pink	Low
Scattered in Simpson pasture, log landings, edge of yard, roadsides			
Minuartia patula	7	Slender Sandwort	Low
Scattered in patches on exposed dolomite flatrock of dolomite glades			
Paronychia canadensis	4	Tall Forked Chickweed	Very Rare
Isolated local population in dry gravel wash of dry-mesic bottomland woodland			
SAPONARIA OFFICINALIS		Bouncing Bet	Very Rare
Small flowering clump on gravel bar of Bryant Creek			
Silene stellata	5	Starry Campion	Low
Widely scattered in dry-mesic sandstone forests, dry-mesic bottomland forests, gravel washes			
Silene virginica	7	Fire Pink	Rare
Isolated populations in a few chert woodlands, and dolomite glade			
STELLARIA GRAMINEA		Common Stitchweed	Rare
Small local population along dolomite spring at culvert crossing before glade [2105]			
STELLARIA MEDIA		Common Chickweed	Low
Locally common on ledges and base of moist dolomite cliffs, along streams, in yard, roadsides, pasture			

CELASTRACEAE — 3 Taxa

Scientific Name	C-value	Common Name	Abundance
Celastrus scandens	3	Climbing Bittersweet	Low
Isolated occurrences in mesic bottomland forests, riverbanks, grown over old fields			
EUONYMUS HEDERACEUS		Wintercreeper	Low
Mesic bottomland forests, dolomite talus, mesic dolomite forests			
Euonymus obovatus	9	Running Strawberry	Rare
Widely scattered in dolomite talus, mesic dolomite forests, ledges at base of moist dolomite cliffs			

CHENOPODIACEAE — 6 Taxa

Scientific Name	C-value	Common Name	Abundance
CHENOPODIUM ALBUM		Lamb's Quarters	Low
Isolated in upland flatwoods, sporadic on gravel bars of Bryant Creek			
CHENOPODIUM AMBROSIOIDES		Mexican Tea	Low
Occasional in sandy openings of riverfront forests, sandbars			

Chenopodium missouriense	1	Missouri Goosefoot	Very Rare
One occurrence on gravel bar along Bryant Creek across from Coon Den Bluff			
Chenopodium pratericola	0	Desert Goosefoot	Very Rare
Chris Crabtree found one plant on gravel bar along Bryant Creek			
CHENOPODIUM SIMPLEX		Maple-Leaved Goosefoot	Rare
Scattered in silty dolomite deposits along base of moist dolomite cliffs			
Chenopodium standleyanum	3	Woodland Goosefoot	Rare
Base of dolomite cliffs and in riverfront forests			

CISTACEAE — 2 Taxa

Scientific Name	**C-value**	**Common Name**	**Abundance**
Lechea mucronata	5	Hairy Pinweed	Low
Isolated on exposed gravelly soil of open dry chert woodlands			
Lechea tenuifolia	4	Slender-Leaved Pinweed	Low
Widely scattered in open, exposed clayey soil of upland flatwoods			

CLEOMACEAE — 1 Taxon

Scientific Name	**C-value**	**Common Name**	**Abundance**
Polanisia dodecandra subsp. ***trachysperma***	4	Rough-Seeded Clammy Weed	Low
Widely scattered on sandbars and gravel bars on Bryant Creek			

CLUSIACEAE — 6 Taxa

Scientific Name	**C-value**	**Common Name**	**Abundance**
Hypericum drummondii	4	Nits and Lice	Rare
Sterile lichen-covered clayey soil in open ROW upland flatwoods			
Hypericum mutilum subsp. *mutilum*	4	Weak St. John's Wort	Low
Wet depressions and muddy road ruts of old logging roads, yards, pastures, moist dolomite ledges, + dolomite springs			
Hypericum prolificum	4	Shrubby St. John's Wort	Low
Widely scattered in upland flatwoods, dry sandstone woodlands, dry-mesic bottomland forests, dry rocky gravel washes			
Hypericum punctatum	3	Spotted St. John's Wort	Low
Sparsely scattered in dry and dry-mesic sandstone woodlands, roadside ditches, low upland drainages			
Hypericum sphaerocarpum	5	Round-Fruited St. John's Wort	Low
Scattered colonies around dolomite glades and dry dolomite woodlands			
Hypericum strangulum	6	Common St. Andrew's Cross	Moderate
Scattered in dry sandstone and chert woodlands, upland flatwoods, sandstone glade			

CONVOLVULACEAE — 9 Taxa

Scientific Name	C-value	Common Name	Abundance
Calystegia sepium	1	Hedge Bindweed	Low
Isolated on gravel bar on Bryant Creek			
CONVOLVULUS ARVENSIS		Field Bindweed	Low
Common around stable			
Cuscuta campestris	4	Prairie Dodder	Low
Scattered along riverfront forests, on gravel bars growing on Justicia americana			
Cuscuta compacta	7	Compact Dodder	Rare
Isolated growing on Lindera benzoin in mesic bottomland stream terrace			
Evolvulus nuttallianus	8	Shaggy Evolvulus	Very Rare
Few local occurrences on dolomite glade			
IPOMOEA COCCINEA		Scarlet Morning Glory	Low
Scattered on sandbars along Bryant Creek			
Ipomoea lacunosa	1	Small Morning Glory	Low
Scattered on gravel bars along Bryant Creek			
Ipomoea pandurata	2	Wild Sweet Potato	Moderate
Scattered on dolomite glades, dry-mesic bottomland woodlands, gravel washes			
IPOMOEA PURPUREA		Common Morning Glory	Very Rare
One occurrence in weedy grasses next to carport			

CORNACEAE — 6 Taxa

Scientific Name	C-value	Common Name	Abundance
Cornus alternifolia	8	Pagoda Dogwood	Rare
Restricted to mesic dolomite forest along talus slope and moist ledges at base of Coon Den Bluff			
Cornus amonum subsp. ***obliqua***	5	Pale Dogwood	Low
Isolated colonies on gravel bars and riverbanks of Bryant Creek; also rarely on gravel washes			
Cornus drummondii	2	Rough-Leaved Dogwood	Very Rare
One small tree flowering on edge of dolomite glade			
Cornus florida	5	Flowering Dogwood	Moderate
Scattered on dolomite glades, dry and dry-mesic chert and dolomite woodland, dry-mesic sandstone woodland; well-developed understory canopy in dry-mesic to mesic chert and sandstone forests.			
CORNUS MAS		Cornelia Cherry	Very Rare
One small tree planted behind house			
Nyssa sylvatica	5	Black Gum	Low
Scattered to isolated trees in dry to dry-mesic woodlands and forests, upland flatwoods, rocky ravines			

CRASSULACEAE — 1 Taxon

Scientific Name	C-value	Common Name	Abundance
Sedum ternatum	6	Wild Stonecrop	Very Rare
Isolated population covering dolomite boulders and stable riverbank at the base of talus along edge of Bryant Creek			

CUCURBITACEAE — 2 Taxa

Scientific Name	C-value	Common Name	Abundance
Cucurbita pepo var. ***ozarkana***	2	Yellow-Flowered Gourd	Very Rare
Isolated occurrences on sandbars along Bryant Creek.			
Sicyos angulatus	4	Bur Cucumber	Low
Occasional along streambanks of Bryant Creek			

EBENACEAE — 1 Taxon

Scientific Name	C-value	Common Name	Abundance
Diospyros virginiana	3	Persimmon	Low
Widely scattered on dolomite glades, dry chert woodlands, pastures, riverfront forests			

ELAEAGNACEAE — 2 Taxa

Scientific Name	C-value	Common Name	Abundance
ELAEAGNUS UMBELLATA		Autumn Olive	Rare
Few isolated occurrences in open upland flatwoods, dry sandstone woodland, pastures, along logging roads, dry-mesic bottomland woodland; increasing seedlings			
ELAEAGNUS ANGUSTIFOLIA		Russian Olive	Very Rare
One large old small tree found next to spicebush terrace seep			

ERICACEAE — 5 Taxa

Scientific Name	C-value	Common Name	Abundance
Monotropa hypopithys	8	Pinesap	Very Rare
One isolated population at base of dry sandstone ledge and dry sandstone woodlands			
Monotropa uniflora	7	Indian Pipe	Rare
Isolated occurrences in dry chert woodland and mesic sandstone forest			
Vaccinium arboreum	6	Farkleberry	Moderate
Locally common on summits of dry sandstone ledges in dry sandstone woodlands; also scattered in dry chert woodland, upland flatwoods, edge of Simpson Pasture			
Vaccinium pallidum	4	Late Low Blueberry	High
Widespread, often dominant understory in dry and dry-mesic chert and sandstone woodlands, top of dry sandstone cliffs and ledges, upland flatwoods			
Vaccinium stamineum	6	Deerberry	Low
Widely scattered in dry chert and sandstone woodlands, upland flatwoods			

EUPHORBIACEAE — 14 Taxa

Scientific Name	C-value	Common Name	Abundance
Acalypha deamii	7	Large-Seeded Mercury	Very Rare (S1)
Isolated in low gravelly area of riverfront forests [2127]			
Acalypha monococca	3	One-Seeded Slender Mercury	Low
Widely scattered on dolomite glade, gravel washes, and mesic bottomland forests			

Acalypha rhomboidea	1	Rhombic Copperleaf	Low
Scattered in riverfront forests			
Acalypha virginica	2	Virginia Mercury	Moderate
Scattered in upland flatwoods, dry chert and sandstone woodlands			
Croton capitatus var. ***capitatus***	0	Hogwort	Moderate
Scattered on dolomite glades, sandstone glade, upland flatwoods			
Croton gladulosus var. ***septentrionalis***	1	Sand Croton	Low
Widely scattered in riverfront forests, gravel washes, gravel bars			
Croton monanthogynus	2	Prairie Tea	Moderate
Scattered on dolomite glades, upland flatwoods			
Croton wildenowii	4	Common Rushfoil	Moderate
Locally dense cover in open dry sterile clayey soil of flatwoods, dirt logging roads, ROWs, open dry sandstone woodlands			
Euphorbia corollata	3	Flowering Spurge	Low
Scattered on dolomite glades, upland flatwoods, open dry chert and sandstone woodlands mostly south of Hwy N, Hwy ROWs, along gravel roads, pastures, yard			
Euphorbia dentata	0	Toothed Spurge	Low
Dolomite glades, upland flatwoods, riverfront forests, gravel washes			
Euphorbia maculata	0	Creeping Spurge	Low
Scattered on dolomite outcrops on dolomite glades, and in asphalt cracks of highway			
Euphorbia nutans	0	Nodding Spurge	Low
Scattered mostly in open sand of riverfront forests, sandbars, gravel bars, gravel washes			
Euphorbia prostrata	8	Groundfig Spurge	Low
Several plants growing along edge of driveway			
Tragia betonicifolia	4	Noseburn	Rare
Widely scattered across open dolomite glades			

FABACEAE — 56 Taxa

Scientific Name	**C-value**	**Common Name**	**Abundance**
Acaciella angustissima	10	Prairie Acacia	Rare
Few isolated stems among red cedars on dolomite glade and in rocky dry dolomite woodland			
ALBIZIA JULIBRISSIN		Mimosa	Very Rare
One small tree found on gravel road drainage cut			
Amorpha canescens	8	Leadplant	Low
Widely scattered in open dry sandstone and chert woodlands, mostly south of Hwy N in logged portion			
Amphicarpaea bracteata	4	Hog Peanut	High
Locally common in all dry, dry-mesic woodlands and forests, mesic forests, upland flatwoods			
Apios americana	6	Groundnut	Low
Along dolomite spring and mesic bottomland forests			
Astragalus crassicarpus var. ***trichocalyx***	7	Ground Plum	Very Rare
Restricted to dolomite glade and dry dolomite woodland along Hwy N east end of park			

Baptisia bracteata* var. *leucophaea	7	Cream Wild Indigo	Low
Widely scattered in open dry chert and sandstone woodlands, upland flatwoods, highway ROWs			
Cercis canadensis* var. *canadensis	3	Redbud	Low
Among red cedars on dolomite glades, dry-rocky dolomite woodlands, dry sandstone woodlands, edges of dry chert cliffs			
Chamaecrista fasciculata	2	Partridge Pea	Low
Widely scattered in dry chert woodland, dolomite glades, Hwy ROWs, and along logging roads			
Chamaecrista nictitans* var. *nictitans	2	Wild Sensitive Plant	Moderate
Scattered in open upland flatwoods, dry chert and sandstone woodlands, edge of pastures			
Clitoria mariana	7	Butterfly Pea	Low
Widely scattered in dry shortleaf pine-dominated sandstone and chert woodlands			
Crotalaria sagittalis	5	Rattlebox	Low
Dry open rocky sandstone and chert woodlands, sandstone glade, upland flatwoods			
Dalea candida	8	White Prairie Clover	Low
Widely scattered to isolated on dolomite glades, dry dolomite woodlands, dry cliff edges			
Dalea purpurea	8	Purple Prairie Clover	Low
Scattered on dolomite glades, open dry dolomite woodlands, dry dolomite cliff edges			
Desmanthus illinoiensis	3	Illinois bundle Flower	Very Rare
One population isolated along Highway N ROW			
Desmodium ciliare	5	Hairy Tick Trefoil	Low
Occasional in dry chert and sandstone woodland, upland flatwoods			
Desmodium cuspidatum	5	Bracted Tick Trefoil	Low
Widely scattered in dry and dry-mesic chert woodland, dry-mesic dolomite woodland and forests, dry-mesic bottomland woodlands, dry gravel washes			
Desmodium glabellum	3	Dilleni's Tick Trefoil	Low
Scattered in open dry chert and sandstone woodlands			
Desmodium laevigatum	7	Smooth Tick Trefoil	Low
Scattered in dry and dry mesic sandstone and chert woodlands			
Desmodium marilandicum	5	Small-Leaved Tick Trefoil	Moderate
Locally common in open dry and dry-mesic chert woodland, upland flatwoods			
Desmodium nutallii	7	Nuttall's Tick Trefoil	Rare
Scattered in open dry and dry-mesic chert woodlands, upland flatwoods			
Desmodium paniculatum	3	Panicled Tick Trefoil	Rare
Scattered in dry chert and sandstone woodlands			
Desmodium perplexum	3	Confusing Trefoil	Low
Scattered in dry chert and sandstone woodlands, upland flatwoods			
Desmodium rotundifolium	6	Round-Leaved Tick Trefoil	Low
Occasional in dry rocky chert and sandstone woodlands			
Desmodium sessilifolium	5	Sessile-Leaved Tick Trefoil	Rare
Scattered on dolomite glades			
Galactia regularis	6	Milk Pea	High
On dolomite glades, dry chert, sandstone, and dolomite woodlands			

Gleditsia triacanthos	2	Honey Locust	Low
Scattered throughout Simpson Pasture, old fields			
GLYCINE MAX		Soy Bean	Very Rare
Isolated occurrences on sandbars and sandy openings of riverfront forests			
Hylodesmum glutinosum	4	Pointed Tick Trefoil	Moderate
Widespread across all dry-mesic and mesic woodlands and forests			
Hylodesmum nudiflorum	4	Bare-Stemmed Tick Trefoil	High
Locally common in dry, dry-mesic, and mesic woodlands and forests			
Hylodesmum pauciflorum	8	Small-Flowered Tick Trefoil	Rare
Two isolated colonies along spicebush seeps of steep sandstone ravines			
KUMMEROWIA STIPULACEA		Korean Bush Clover	Moderate
Common in pastures, old fields, roadsides, yard			
KUMMEROWIA STRIATA		Japanese Bush Clover	High
Scattered in pastures, old fields, sandbars, gravel roadsides, yard			
LESPEDEZA CUNEATA		Silky Bush Clover	High
Widespread in pastures, log landings, along logging roads; scattered in open dry sandstone and chert woodlands, upland flatwoods south of Hwy N.			
Lespedeza frutescens	5	Violet Bush Clover	Low
Widely scattered in dry sandstone and chert woodland, upland flatwoods			
Lespedeza hirta subsp. ***hirta***	7	Hairy Bush Clover	Moderate
Locally common in exposed barren rocky slopes of dry chert (sandstone) woodlands			
Lespedeza procumbens	4	Trailing Bush Clover	Moderate
Scattered in dry sandstone and chert woodlands, upland flatwoods			
Lespedeza repens	4	Creeping Bush Clover	Moderate
Scattered in dry sandstone woodlands mostly south of Hwy N			
Lespedeza virginica	5	Slender Bush Clover	Low
Scattered sparsely on dolomite glades, open dry chert, sandstone and dolomite woodlands, upland flatwoods			
MELILOTUS ALBUS		White Sweet Clover	Low
Scattered primarily along edge of highway, pastures, logging roads			
MELILOTUS OFFICINALIS		Yellow Sweet Clover	Moderate
Scattered primarily along highway ROW			
Mimosa quadrivalis var. ***nuttallii***	6	Sensitive Briar	Low
Widely scattered in open dry sandstone and chert woodlands mostly south of Hwy N			
Orbexilum pedunculatum var. ***pedunculatum***	6	Sampson's Snakeroot	Low
Isolated on dolomite glade, dry dolomite woodland, and upland flatwoods			
Pediomelum tenuifolium	8	Scurfy Pea	Moderate
Locally common in upland flatwoods, scattered in dry chert and sandstone woodlands			
ROBINIA PSEUDOACACIA		Black Locust	Low
Few scattered trees in dry-mesic bottomland woodlands of Central Hollow			

Senna marilandica	4	Maryland Senna	Low
Widely scattered in dry-mesic bottomland woodlands, gravel washes, dry-mesic bottomland forests, riverfront forests			
Strophostyles helvola	2	Trailing Wild Bean	Low
Sandy openings of riverfront forests, isolated on gravel bars of Bryant Creek			
Strophostyles umbellata	2	Pink Wild Bean	Low
Scattered on open dry chert and sandstone woodlands, dolomite glades, margins of logging roads			
Stylosanthes biflora	5	Pencil Flower	Low
Isolated occurrences on sandstone glade, dry sandstone and chert woodlands			
Tephrosia virginiana	5	Goat's Rue	Moderate
Locally common on dry exposed soil of open chert and sandstone woodland, upland flatwoods, cherty residuum on dolomite glade			
TRIFOLIUM CAMPESTRE		Low Hop Clover	Low
Locally common in pastures, old fields, along logging roads, yard			
TRIFOLIUM DUBIUM		Little Hop Clover	Low
Scattered in yard, pasture, around stable, along gravel road			
TRIFOLIUM PRATENSE		Red Clover	Low
Scattered along roadsides, logging road, pasture, yard			
TRIFOLIUM REPENS		White Clover	Moderate
Locally common in yard, around stable, in pastures			
Vicia caroliniana	6	Wood Vetch	Low
Widely scattered in open chert and sandstone woodlands, along streambanks			
VICIA SATIVA subsp. NIGRA		Common Vetch	Low
Occasional along edge of logging roads, Hwy N ROW, pastures			

FAGACEAE — 11 Taxa

Scientific Name	**C-value**	**Common Name**	**Abundance**
Quercus alba	4	White Oak	High
Locally common to scattered in all woodland and forest natural communities			
Quercus coccinea	5	Scarlet Oak	Low
Local populations isolated primarily on mid-slope benches of dry-mesic chert and dolomite forests			
Quercus imbricaria	3	Shingle Oak	Very Rare
One tree found in Simpson's Pasture			
Quercus macrocarpa	4	Bur Oak	Low
Isolated in mesic bottomland forest, riverfront forest, and riverbanks along Bryant Creek			
Quercus marilandica var. ***marilandica***	4	Blackjack Oak	Low
Open excessively drained steep rocky slopes of exposed chert and sandstone woodlands			
Quercus muehlenbergii	5	Chinquapin Oak	Moderate
Scattered in dry to dry-mesic dolomite woodlands, along crest of dry dolomite cliffs, and dolomite talus			
Quercus rubra	5	Red Oak	Moderate
Scattered in north and east-facing valleys of dry-mesic to mesic chert, sandstone, and dolomite woodlands and forests, also dolomite talus slopes			

Quercus shumardii var. ***acerifolia***	5	Schneck Oak	Low
Scattered in wooded portions of dolomite glades, dry dolomite woodlands, tops of dry dolomite cliffs.			
Quercus shumardii var. ***shumardii***	7	Shumard Oak	Rare
Widely scattered in mesic bottomland forests, riverfront forests, and riverbanks along Bryant Creek			
Quercus stellata	4	Post Oak	Moderate
Dolomite glades, upland flatwoods, dry chert and sandstone woodlands			
Quercus velutina	4	Black Oak	Moderate
Scattered in upland flatwoods, dry chert and sandstone woodlands			

FUMARIACEAE — 2 Taxa

Scientific Name	**C-value**	**Common Name**	**Abundance**
Corydalis flavula	3	Pale Corydalis	Moderate
Scattered in dry-mesic chert forests, mesic dolomite forests, dry-mesic and mesic bottomland forests, dry-mesic bottomland woodlands			
Dicentra cucullaria	6	Dutchman's Breeches	Low
Mesic sandstone and dolomite forests, mesic bottomland forests, dolomite talus			

GENTIANACEAE — 2 Taxa

Scientific Name	**C-value**	**Common Name**	**Abundance**
Gentiana puberulenta	9	Downy Gentian	Very Rare
Open dry chert woodland south side of Hwy N			
Sabatia angularis	4	Rose Gentian	Rare
Scattered on dolomite glade			

GERANIACEAE — 2 Taxa

Scientific Name	**C-value**	**Common Name**	**Abundance**
Geranium carolinianum	0	Carolina Cranebill	Low
Scattered in pastures, along logging roads, Hwy ROW, yard			
Geranium maculatum	5	Wild Geranium	Low
Scattered in mesic sandstone and dolomite forests, mesic bottomland forests, dolomite talus, moist dolomite cliff ledges			

GROSSULARIACEAE — 1 Taxon

Scientific Name	**C-value**	**Common Name**	**Abundance**
Ribes missouriense	3	Wild Gooseberry	Moderate
Upland flatwoods, dry sandstone woodland, dry dolomite cliff ledges			

HAMAMELIDACEAE — 1 Taxon

Scientific Name	**C-value**	**Common Name**	**Abundance**
Hamamelis vernalis	7	Vernal Witch Hazel	Low
Restricted to gravel washes in Central Hollow south side of park, and on gravel bars on Bryant Creek			

HELIOTROPIACEAE — 1 Taxon

Scientific Name	C-value	Common Name	Abundance
Heliotropium tenellum	8	Glade Heliotrope	Moderate

HYDRANGEACEAE — 1 Taxon

Scientific Name	C-value	Common Name	Abundance
Hydrangea arborescens subsp. ***discolor***	7	Wild Hydrangea	High
Dry and moist dolomite cliff, dolomite talus, moist sandstone ledges			

HYDROPHYLLACEAE — 4 Taxa

Scientific Name	C-value	Common Name	Abundance
Ellisia nyctelea	1	Aunt Lucy	Moderate
Scattered in mesic bottomland forests, riverfront forests, found in dolomite glade			
Hydrophyllum canadense	7	Canada Waterleaf	Low
Confined to mesic dolomite forests including associated dolomite talus			
Hydrophyllum virginianum	4	Virginia Waterleaf	Low
Scattered in mesic dolomite forests, dolomite talus, moist dolomite ledges at base of cliff			
Phacelia hirsuta	4	Hairy Phacelia	Rare
Isolated occurrence in dry dolomite woodland, and along gravel road			

JUGLANDACEAE — 7 Taxa

Scientific Name	C-value	Common Name	Abundance
Carya cordiformis	5	Bitternut Hickory	Low
Mesic sandstone and dolomite forests, dry-mesic bottomland woodlands			
CARYA ILLINOINENSIS		Pecan	Very Rare
One tree planted behind house			
Carya ovalis	6	Red Hickory	Low
Widely scattered in dry chert and sandstone woodlands			
Carya ovata var. ***ovata***	4	Shagbark Hickory	Low
Widely scattered in dry-mesic chert and sandstone woodlands, dry-mesic chert forests			
Carya texana	5	Black Hickory	Moderate
Scattered on high ridges of dry chert and sandstone woodlands, upland flatwoods			
Carya tomentosa	5	Mockernut Hickory	Low
Scattered in protected headwater draws and lower slopes of dry-mesic chert and sandstone forests, and dry-mesic bottomland woodlands			
Juglans nigra	4	Black Walnut	Low
Scattered in mesic dolomite forests, dry-mesic and mesic bottomland forests, dolomite talus, pastures, yard			

LAMIACEAE — 31 Taxa

Scientific Name	C-value	Common Name	Abundance
AJUGA REPTANS		Common Bugle	Rare
Small population scattered in tall fescue behind stable			

Blephilia ciliata	6	Ohio Horse Mint	Low	Dry and dry-mesic dolomite woodlands and forests, dry and moist dolomite cliff
Blephilia hirsuta var. ***hirsuta***	7	Wood Mint	Rare	Dry gravel wash
Clinopodium arkansanum	7	Low Calamint	High	Dense cover on thin soil over dolomite bedrock of glades
Cunila origanoides	6	Dittany	High	Locally common throughout dry and dry-mesic woodlands, upland flatwoods, along dry sandstone ledges, gravel road edges
Hedeoma hispida	3	Rough Pennyroyal	Low	Exposed barren chert of dry chert woodlands and along gravel roads
Hedeoma pulegioides	4	American Pennyroyal	Very Rare	Growing in gravel deposits of high gradient chert boulder wash in headwaters of dry chert woodland; only known population
LAMIUM AMPLEXICAULE		Henbit	Moderate	Scattered in yard and around stable, pastures
LAMIUM PURPUREUM		Purple Dead Nettle	Low	Widely scattered in yard around house
Lycopus americanus	4	Common Water Horehound	Very Rare	Known only from one Ozark fen east side of park
Lycopus rubellus	6	Stalked Water Horehound	Rare	Scattered along seepy dolomite ledges at riverbank edge of Bryant Creek
MENTHA x PIPERITA		Peppermint	Very Rare	Few plants found in stagnant pools of old river channel slough across from Coon Den
Monarda bradburiana	5	Bradbury Bee Balm	Low	Scattered in dry chert, sandstone, and dolomite woodlands; upland flatwoods
Monarda fistulosa subsp. ***fistulosa***	4	Wild Bergamot	Low	Widely scattered in dry dolomite woodland, pastures, roadsides, dolomite glades
PERILLA FRUTESCENS		Beefsteak Plant	High	Locally common on gravel deposits in gravel washes, ravines, riverfront forests, gravel road edges, gullies, pastures, yard, gravel bars
Physostegia virginiana subsp. ***praemorsa***	7	False Dragonhead	Low	Scattered on dolomite glades
Physostegia virginiana subsp. ***virginiana***	5	False Dragonhead	Low	On boulders and dolomite talus along riverbank of Bryant Creek
Prunella vulgaris var. ***lanceolata***	1	Self-Heal	Low	Widely scattered along gravel washes, streams, gravel road margins, sinkhole ponds, upland flatwoods
Pycnanthemum pilosum	5	Hairy Mountain Mint	Low	Local isolated populations in open dry chert and sandstone woodlands, gravel washes
Pycnanthemum tenuifolium	4	Slender Mountain Mint	Low	Scattered in openings of upland flatwoods, dry chert and sandstone woodlands, dolomite glades, Hwy ROWs

Pycnanthemum virginianum	6	Common Mountain Mint	Very Rare
Isolated on seepy sandstone glade, Ozark fen			
Salvia lyrata	3	Lyre-Leaved Sage	High
Locally common to widespread in dry and dry-mesic woodlands, upland flatwoods, pastures, old fields, gravel washes, stream terraces, along gravel and logging roads			
Scutellaria bushii	10	Bush's Skullcap	Rare
Restricted to isolated populations on dolomite glades [2120]			
Scutellaria incana	5	Downy Skullcap	Low
Along streambanks in valleys, rocky headwater ravines			
Scutellaria lateriflora	5	Mad-Dog Skullcap	Rare
One population at base of landslide at east end of Coon Den Bluff			
Scutellaria ovata subsp. ***ovata***	5	Heart-Leaved Skullcap	Rare
Few plants found among ledges of moist dolomite cliff			
Scutellaria parvula var. ***parvula***	4	Small Skullcap	Low
Scattered in patches on dolomite glades, dry chert and dolomite woodland			
Stachys tenuifolia	4	Rough Hedge Nettle	Low
Restricted to moist sandy soil along slough in riverfront forests along Bryant Creek			
Teucrium canadense var. ***canadense***	2	Germander	Moderate
Widely scattered in pastures, old fields, along logging roads and landings, Hwy ROW			
Trichostema brachiatum	4	False Pennyroyal	Low
Scattered on dolomite glade mostly on ash of red cedar burn pile; also dolomite ditch along Hwy N			
Trichostema dichotomum	6	Blue Curls	Low
Along edge of old logging road in upland flatwoods south of Hwy N			

LAURACEAE — 2 Taxa

Scientific Name	C-value	Common Name	Abundance
Lindera benzoin	5	Spicebush	Moderate
Mesic sandstone and dry-mesic chert forests in mid to lower slopes of valleys; occasional in dry mesic to mesic dolomite forests, dolomite talus slopes, streambanks			
Sassafras albidum	2	Sassafras	Moderate
Understory of dry and dry mesic woodlands, dolomite talus, pastures and old fields			

LINACEAE — 3 Taxa

Scientific Name	C-value	Common Name	Abundance
Linum medium var. ***texanum***	5	Small Yellow Flax	Low
Widely scattered in dry chert woodlands, openings in upland flatwoods,			
Linum sulcatum	5	Grooved Yellow Flax	Rare
Scattered on dolomite glades			
Linum virginianum	10	Woodland Yellow Flax	Rare
Widely scattered in open dry chert woodlands, sandstone glade [2122]			

LINDERNIACEAE — 1 Taxon

Scientific Name	**C-value**	**Common Name**	**Abundance**
Lindernia dubia var. ***anagallidea***	4	False Pimpernel	Rare
Isolated in muddy depressions of deep road ruts on logging roads, margins of sinkhole pond, mudflats along Bryant Creek			

LYTHRACEAE — 5 Taxa

Scientific Name	**C-value**	**Common Name**	**Abundance**
Ammannia coccinea	6	Common Toothcup	Moderate
Locally common on mudflats and riverbanks along Bryant Creek			
Ammannia robusta	8	Grand Toothcup	Moderate
Locally common on mudflats and riverbanks along Bryant Creek			
Cuphea viscosissima	4	Waxweed	Very Rare
Found only in one patch on dolomite glade			
LAGERSTROEMIA INDICA		Crape Myrtle	Rare
Large shrubs planted along driveway at house			
Rotala ramosior	4	Toothcup	High
Locally common on mudflats, moist sand along water's edge of Bryant Creek			

MAGNOLIACEAE — 1 Taxon

Scientific Name	**C-value**	**Common Name**	**Abundance**
LIRIODENDRON TULIPIFERA		Tulip Poplar	Very Rare
One tree planted in yard, introduced			

MALVACEAE — 2 Taxa

Scientific Name	**C-value**	**Common Name**	**Abundance**
SIDA SPINOSA		Prickly Sida	Very Rare
Small cluster of plants on drying mud bank of artificial pond east of house			
Tilia americana var. ***americana***	5	American Basswood	Low
Widely scattered in mesic dolomite forests, dolomite talus, base of moist chert cliff			

MENISPERMACEAE — 3 Taxa

Scientific Name	**C-value**	**Common Name**	**Abundance**
Calycocarpum lyonii	7	Cupseed	Low
Widely scattered in riverfront forests along Bryant Creek			
Cocculus carolinus	5	Carolina Snailseed	Low
In thickets along dry washes of dry-mesic bottomland woodlands of Central Hollow			
Menispermum canadense	4	Moonseed	Low
Isolated in red cedars on dolomite glade, in dry chert woodland, dry-mesic and mesic bottomland forests, riverfront forests			

MOLLUGINACEAE — 1 Taxon

Scientific Name	C-value	Common Name	Abundance
MOLLUGO VERTICILLATA		Carpet Weed	Moderate
Scattered on sandbars and gravel bars along Bryant Creek			

MORACEAE — 2 Taxa

Scientific Name	C-value	Common Name	Abundance
FATOUA VILLOSA		Hairy Crabweed	Low
Along steep muddy riverbank of Bryant Creek			
Morus rubra	4	Red Mulberry	Low
Locally common understory tree in mesic bottomland forests of stream terraces, along riverbanks, dolomite talus			

NYCTAGINEAE — 1 Taxon

Scientific Name	C-value	Common Name	Abundance
Mirabilis nyctaginea	0	Wild Four O'Clock	Rare
Sparse in sandy openings of riverfront forests, along eroding riverbanks of Bryant Creek			

NYMPHACEAE — 1 Taxon

Scientific Name	C-value	Common Name	Abundance
Nuphar advena subsp. ***ozarkana***	6	Ozark Spatterdock	Rare
Isolated in quiet waters of shaded sloughs, backwaters along Bryant Creek			

OLEACEAE 6 Taxa

Scientific Name	C-value	Common Name	Abundance
Chionanthus virginicus	10	Fringe Tree	Very Rare
Less than 20 small trees observed hanging from top of 100 foot high dry dolomite cliff [2111]			
Fraxinus americana	4	White Ash	Low
Scattered on dolomite glade, dry and dry-mesic dolomite and chert woodland, dry-mesic and mesic bottomland woodlands, mesic bottomland forests, dolomite talus			
Fraxinus pennsylvanica var. ***subintegerrima***	2	Green Ash	Low
Scattered in mesic bottomland forests and dolomite talus along Bryant Creek			
Fraxinus quadrangulata	7	Blue Ash	Rare
Isolated local populations in upland flatwoods, dry and dry-mesic chert woodland, dry sandstone woodland, dry dolomite cliff			
LIGUSTRUM VULGARE		European Privet	Very Rare
Several shrubs growing on sandy riverbank along Bryant Creek			
SYRINGA VULGARIS		Lilac	Very Rare
One shrub persisting next to carport; planted			

ONAGRACEAE — 8 Taxa

Scientific Name	C-value	Common Name	Abundance
Circaea canadensis	2	Enchanter’s Nightshade	Moderate
Scattered in mesic dolomite forests, dolomite talus, on moist dolomite ledges			
Ludwigia alternifolia	4	Rattlebox	Low
Scattered throughout low wet depressions in upland flatwoods, in wet muddy road rut depressions of old logging roads, along spring branches			
Ludwigia palustris	4	Marsh Purslane	Rare
Isolated in mudflats along edge of slackwater pools along Bryant Creek			
Oenothera biennis	0	Common Evening Primrose	Low
Isolated on gravel bars of Bryant Creek			
Oenothera filiformis	1	Biennial Gaura	Rare
Widely scattered along highway roadsides			
Oenothera linifolia	4	Thread-Leaved Sundrops	Rare
On barren sand-clay lichen-covered soil of upland flatwoods in ROW			
Oenothera macrocarpa subsp. ***macrocarpa***	7	Missouri Primrose	Very Rare
Limited to less than ten observed non-flowering plants scattered on dolomite glade			
Oenothera villosa var. ***villosa***	2	Hairy Evening Primrose	Very Rare
Two plants observed along edge of gravel road to house			

OXALIDACEAE — 2 Taxa

Scientific Name	C-value	Common Name	Abundance
Oxalis dillenii	0	Yellow Wood Sorrel	Moderate
Present in most natural communities; scattered in dry and dry-mesic woodlands, upland flatwoods, pastures, roadsides, yard, gravel washes, riverfront forests			
Oxalis violacea	5	Violet Wood Sorrel	Moderate
Scattered on dolomite glades, dry dolomite woodlands, dry-mesic bottomland woodlands			

PAPAPERACEAE — 1 Taxon

Scientific Name	C-value	Common Name	Abundance
Sanguinaria canadensis	5	Bloodroot	Low
Scattered in mesic dolomite forests, dolomite talus			

PARNASSIACEAE — 1 Taxon

Scientific Name	C-value	Common Name	Abundance
Parnassia grandiflora	10	Grass-Of-Parnassus	Very Rare
Several plants isolated in Ozark fen along spring-fed stream			

PASSIFLORACEAE — 2 Taxa

Scientific Name	C-value	Common Name	Abundance
Passiflora incarnata	2	Passion Flower	Low
Edge of eroded riverbank along Bryant Creek			

Passiflora lutea var. ***glabriflora***	4	Yellow Passion Flower	Low
Isolated along riverbank in mesic dolomite forest, thicket in dolomite glade, sandbar			

PHYLLANTHACEAE — 1 Taxon

Scientific Name	C-value	Common Name	Abundance
Phyllanthus caroliniensis	5	Carolina Leaf-Flower	Very Rare
Small population in wet mud depression of open upland flatwoods			

PHYTOLACACEAE — 1 Taxon

Scientific Name	C-value	Common Name	Abundance
Phytolacca americana var. ***american***	2	Pokeweek	Low
In disturbed gravelly soil piles from logging operations near log landings south of Hwy N, displaced rocky exposed soil of small landslide below Coon Den Bluff, disturbed gravel roadsides			

PLANTAGINACEAE — 6 Taxa

Scientific Name	C-value	Common Name	Abundance
Callitriche terrestris subsp. ***terrestris***	3	Terrestrial Starwort	Low
On barren compacted soil of dirt roads in upland flatwoods and level ridges			
Plantago aristata	1	Bracted Plantain	Low
Scattered in isolated patches of disturbed gravel in pastures, old fields			
Plantago elongata	1	Slender Plantain	Low
Scattered in upland flatwoods and dry sandstone woodlands			
PLANTAGO LANCEOLATA		English Plantain	Moderate
Locally common in yard, pastures, along roadsides, log landings, logging roads			
Plantago rugelii	0	Red-Stalked Plantain	Rare
Confined to disturbed soil around house, along gravel in driveway			
Plantago virginica	1	Dwarf Plantain	Low
Widely scattered on dolomite glade			

PLATANACEAE — 1 Taxon

Scientific Name	C-value	Common Name	Abundance
Platanus occidentalis	3	Sycamore	Moderate
Locally common in riverfront forests, gravel bars, riverbanks, mesic bottomland forests, gravel washes, disturbed soil of log landings, along gravel roads, landslides			

POLEMONIACEAE — 5 Taxa

Scientific Name	C-value	Common Name	Abundance
Phlox divaricata	4	Blue Phlox	Moderate
Locally common in dry-mesic and mesic bottomland forests, riverfront forests, mesic dolomite forests, dolomite talus, riverbanks			
Phlox paniculata	3	Garden Phlox	Low
Widely scattered along stable forested edges of riverbanks along Bryant Creek; riverfront forests			

Phlox pilosa subsp. ***ozarkana***	6	Prairie Phlox	Low
Widely scattered in open dry chert and sandstone woodlands, upland flatwoods, Hwy ROW			
Phlox pilosa subsp. ***pilosa***	6	Prairie Phlox	Low
Scattered in open dry chert woodlands, especially along roadsides			
Polemonium reptans	6	Jacob's Ladder	Low
Scattered on stream terraces of mesic bottomland forests, mesic dolomite forests			

POLYGALACEAE — 2 Taxa

Scientific Name	C-value	Common Name	Abundance
Polygala senega	6	Seneca Snakeroot	Rare
Scattered on ledges of dry dolomite cliffs, dry dolomite woodlands			
Polygala verticillata	4	Whorled Milkwort	Rare
Widely scattered on dolomite glade, disturbed exposed chert along logging road			

POLYGONACEAE — 15 Taxa

Scientific Name	C-value	Common Name	Abundance
Fallopia scandens	3	Climbing False Buckwheat	Low
Scattered in openings and thickets of riverfront forests, thickets on gravel bars, upland pastures			
Persicaria bicornis	5	Pink Smartweed	Rare (SU)
Isolated occurrences on gravel bars and sandbars along edge of riverfront forests, and riverbanks of Bryant Creek			
Persicaria hydropiperoides	4	Mild Water Pepper	Low
Moist sand and gravel in streambed scours, edge of sloughs, sandbars			
Persicaria lapathifolia	0	Heartsease	Low
On sand and gravel bars along edge of riverfront forests, gravel bars			
PERSICARIA LONGISETA		Creeping Smartweed	Low
Locally common and scattered in yard around house, edge of gravel roads			
PERSICARIA MACULOSA		Lady's Thumb	Low
Isolated occurrences on gravel bars			
Persicaria pensylvanica	1	Pennsylvania Knotweed	Moderate
Locally common in riverfront forests, gravel bars, riverbanks, gravel washes, pond edges			
Persicaria punctata	3	Dotted Smartweed	Low
Scattered in low drainage of dry-mesic bottomland woodands, riverbanks, edge of artificial pond			
Persicaria virginiana	1	Virginia Knotweed	Moderate
Locally common in deep valleys and bottomland forests, scattered in spicebush terrace seeps, along permanent streambanks			
POLYGONUM AVICULARE subsp. AVICULARE		Common Knotweed	Rare
Isolated occurrences on sandbar, edge of highway			
Polygonum aviculare subsp. ***buxiforme***	2	Box Knotweed	Rare
Few plants confined to sandy opening in riverfront forests along Bryant Creek			
Polygonum erectum	1	Erect Knotweed	Rare
On sandbar along Bryant Creek			

Polygonum ramosissimum var. ***prolificum*** Low sandy soil of riverfront forests, thicket in sandy soil along old slough	5	Bushy Knotweed	Rare
RUMEX ACETOSELLA Scattered in patches in upland pasture		Field Sorrel	Low
RUMEX CRISPUS Widely scattered to isolated in upland pastures, yard, edge of gravel roads, log landings		Curly Dock	Low

PORTULACACEAE — 2 Taxa

Scientific Name	**C-value**	**Common Name**	**Abundance**
Claytonia virginica Widespread in dry-mesic woodlands, dry-mesic and mesic forests, bottomland forests, dolomite glades, sandstone and dolomite ledges, roadsides, yard	4	Spring Beauty	High
Phemeranthus calycinus Around 90 plants restricted to fine gravel and sand in an ephemeral wet flatrock slab on a dolomite glade	8	Fame Flower	Very Rare

PRIMULACEAE — 5 Taxa

Scientific Name	**C-value**	**Common Name**	**Abundance**
Lysimachia lanceolata Widely scattered in dry chert and sandstone woodland, upland flatwoods	4	Lance-Leaved Loosestrife	Low
LYSIMACHIA NUMMULARIA Locally common along moist sandy shoreline of Bryant Creek, and seepy dolomite riverbanks		Moneywort	Moderate
Lysimachia quadriflora Restricted to Ozark fens, seepy dolomite ledges along streambanks in lower valleys	8	Narrow-Leaved Loosestrife	Rare
Primula meadii Scattered on dolomite glades, openings in dry dolomite woodlands, moist dolomite ledges of cliffs	7	Shooting Star	Moderate
Samolus parviflorus Edges of permanent stream pools in upland headwater valleys, base of waterfalls, dolomite springs, along seepy dolomite ledges of riverbanks along Bryant Creek	5	Water Pimpernel	Low

RANUNCULACEAE — 23 Taxon

Scientific Name	**C-value**	**Common Name**	**Abundance**
Actaea pachypoda Widely isolated on moist dolomite talus	8	White Baneberry	Rare
Actaea racemosa Scattered sporadically in dry-mesic chert woodlands and forests, dry-mesic dolomite forests, mesic dolomite forests, dolomite talus	7	Black Cohosh	Low
Anemone virginiana var. ***virginiana*** Widely scattered in dry-mesic and mesic dolomite forests, moist dolomite cliff ledges, gravel washes, dry stream terraces	4	Tall Anemone	Low
Aquilegia canadensis Locally common growing in crevices and ledges of dry to moist dolomite cliffs	6	Columbine	Moderate

Clematis virginiana	3	Virgin's Bower	Low
Scattered on sandstone ledges, mesic dolomite forests, in gravel washes			
Delphinium carolinianum subsp. ***carolinianum***	7	Carolina Larkspur	Very Rare
Several plants isolated on one small dolomite glade opening			
Delphinium treleasei	10	Trelease's Larkspur	Very Rare
One flowering plant found near dolomite glade on bald hill			
Delphinium tricorne	6	Dwarf Larkspur	Low
Isolated occurrences in mesic dolomite forests along Bryant Creek			
Hepatica acutiloba	6	Sharp-lobed Hepatica	Low
Widely scattered on moist dolomite talus slopes and mesic dolomite forest; reported by Chris Crabtree			
Hydrastis canadensis	6	Goldenseal	Low
Isolated small colonies in dry-mesic chert forests, mesic dolomite and sandstone forests, dolomite talus			
Isopyrum biternatum	5	False Rue Anemone	Moderate
Moist dolomite cliff ledges, mesic dolomite and bottomland forests, dolomite talus			
Ranunculus abortivus	1	Small-Flowered Buttercup	Moderate
Dry-mesic to mesic chert and dolomite forests, mesic bottomland forests, riverfront forests, yard, upland pastures			
Ranunculus harveyi var. ***harveyi***	7	Harvey's Buttercup	Low
Widely scattered in dry chert and sandstone woodlands, dry to moist sandstone ledges			
Ranunculus hispidus var. ***hispidus***	6	Hispid Buttercup	Moderate
Scattered in dry to dry-mesic chert and dolomite woodlands and forests, dolomite talus			
Ranunculus hispidus var. ***nitidus***	4	Swamp Buttercup	Low
Scattered in dry-mesic to mesic bottomland forests, riverfront forests			
Ranunculus micranthus	3	Rock Crowfoot	Low
Isolated in dry to dry-mesic chert and sandstone woodlands, riverfront forests			
RANUNCULUS PARVIFLORUS		Small-Flowered Crowfoot	Very Rare
Few plants in lawn between pond and stable			
Ranunculus recurvatus var. ***recurvatus***	5	Hooked Buttercup	Moderate
Scattered along moist edges of headwater streams fed by seepage, low slopes of mesic sandstone and dolomite forests, Ozark fen, seep ledges			
RANUNCULUS SARDOUS		Hairy Buttercup	Very Rare
Confined to moist low depressions in fescue pasture behind house [2106]			
RANUNCULUS SCELERATUS var. SCELERATUS		Cursed Buttercup	Rare
Scattered in moist depression of pasture near stable			
Thalictrum dioicum	8	Early Meadow Rue	Low
Few plants along moist to wet dolomite ledges at base of dolomite cliffs			
Thalictrum revolutum	8	Waxy Meadow Rue	Rare
Isolated in mesic bottomland forests			
Thalictrum thalictroides	5	Rue Anemone	High
Widespread to scattered in most woodlands, forests, rock ledges, talus slopes			

RHAMNACEAE — 3 Taxa

Scientific Name	C-value	Common Name	Abundance
Berchemia scandens	6	Supple Jack	Very Rare
Isolated occurrences in gravel wash and dry dolomite woodland			
Ceanothus americanus	7	New Jersey Tea	Low
Widely scattered in open dry chert and sandstone woodlands in previously logged uplands south of Hwy N			
Rhamnus caroliniana	6	Carolina Buckthorn	Moderate
Scattered among red cedar on dolomite glades and dry dolomite woodlands; also dry-mesic sandstone and chert woodlands			

ROSACEAE — 28 Taxa

Scientific Name	C-value	Common Name	Abundance
Agrimonia parviflora	5	Tall Agrimony	Low
Moist to wet soils in spicebush terrace seeps, mesic bottomland forests, gravel washes			
Agrimonia pubescens	4	Soft Agrimony	Low
Scattered in dry-mesic chert and dolomite woodlands, dry-mesic sandstone forests, along banks of valley streambeds			
Amelanchier arborea	6	Shadbush	Low
Scattered in open, dry rocky chert and sandstone woodlands, top of dry dolomite cliffs			
Aruncus dioicus var. ***pubescens***	6	Goat's Beard	Rare
Isolated on moist to seepy dolomite ledges, seeps along sandstone ravines, in spicebush terrace seeps			
Crataegus crus-galli	3	Cockspur Hawthorn	Low
Occasional in dry-mesic bottomland woodlands			
Crataegus uniflora	7	One-Flower Hawthorn	Low
Scattered shrubs and small trees on dolomite glades, dry chert woodlands, dry-mesic bottomland forests, in Simpson Pasture			
Fragaria virginiana	3	Wild Strawberry	Low
Widely scattered patches in upland flatwoods, dry chert and dolomite woodlands, along logging roads			
Geum canadense	2	White Avens	Moderate
Scattered in dry-mesic sandstone woodlands, dry-mesic to mesic sandstone forests, mesic bottomland forests, dry-mesic bottomland woodlands			
Geum vernum	3	Spring Avens	Moderate
Locally common in dry-mesic chert woodlands and forests, dry-mesic to mesic dolomite forests, mesic bottomland forests, edges of old fields and pastures, log landings, yard			
Gillenia stipulata	5	American Ipecac	Low
Scattered in upland flatwoods, dry and dry-mesic chert and sandstone woodlands			
Physocarpus opulifolius var. ***intermedius***	5	Ninebark	Moderate
Scattered on ledges of moist dolomite cliffs, gravel washes, gravel bars			
POTENTILLA RECTA		Sulphur Cinquefoil	Rare
Isolated occurrences along highway ROW			

Potentilla simplex	3	Common Cinquefoil	Moderate	Locally common in grown-over open log landings, along logging roads, roadsides, dry chert woodlands, upland flatwoods, pastures
Prunus americana	4	Wild Plum	Low	Large thicket in Simpson Pasture, widely scattered in open dry sandstone and chert woodlands south of Hwy N
PRUNUS ARMENIACA		Apricot	Very Rare	Planted near house
PRUNUS CERASUS		Sour Cherry	Very Rare	Planted near house
Prunus mexicana	3	Mexican Plum	Low	Widely scattered in dry chert and sandstone woodlands, upland flatwoods
Prunus serotina subsp. ***serotina***	3	Wild Black Cherry	Low	Isolated occurrences in dry sandstone woodlands, dry-mesic dolomite woodlands, dry-mesic bottomland woodlands
PYRUS CALLERYANA		Bradford Pear	Very Rare	Few scattered small trees along logging road next to west gate to glade
PYRUS COMMUNIS		Pear	Very Rare	Few old trees in field next to house
Rosa carolina subsp. ***carolina***	4	Pasture Rose	Moderate	Widely scattered on dolomite glade, upland flatwoods, dry to dry-mesic chert, sandstone and dolomite woodlands, highway ROW
ROSA MULTIFLORA		Multiflora Rose	Moderate	Locally common in disturbed soils of logged areas, along gravel washes and streambeds, pastures, riverfront forests; scattered in mesic bottomland forests, along gravel roads
Rosa setigera	4	Prairie Rose	Low	Isolated along riverbanks, dry sandstone woodland, dolomite glades, stream edges
Rubus ablatus	2	Plains Blackberry	Moderate	Locally common in previously logged portions of dry chert and sandstone woodland s. of Hwy N
Rubus enslenii	5	One-Flowered Dewberry	Moderate	Widely scattered in upland flatwoods, dry and dry-mesic chert and sandstone woodlands, along gravel washes
Rubus flagellaris	3	Common Dewberry	Low	Scattered in open dry chert and sandstone woodlands, old fields, edge of pastures, along logging roads
Rubus mollior	5	Soft Blackberry	Low	Widely scattered in dry-mesic chert and sandstone woodlands and forests
Rubus occidentalis	3	Black Raspberry	Low	Local patches in disturbed soil of logged areas, log landings, openings in riverfront forests, old fields

RUBIACEAE — 12 Taxa

Scientific Name	C-value	Common Name	Abundance
Cephalanthus occidentalis	3	Buttonbush	Rare
Occasional along riverbanks of Bryant Creek			
Diodia teres	2	Buttonweed	Moderate
Scattered locally on dolomite glades, sandstone glade, open dry chert woodlands, gravelly areas along logging roads, pastures, ROWs			
Galium aparine	0	Annual Bedstraw	Moderate
Scattered in mesic bottomland forests, riverfront forests, dry-mesic bottomland woodlands, upland pastures, yard			
Galium arkansanum	6	Arkansas Bedstraw	Low
Scattered in open rocky dry and dry-mesic woodlands			
Galium circaezans	4	Licorice Bedstraw	Low
Scattered on dolomite glades, upland flatwoods, dry chert and sandstone woodlands			
Galium concinnum	4	Shining Bedstraw	Low
Widely scattered in dry-mesic to mesic forests, mesic bottomland forests			
GALIUM PEDEMONTANUM		Piedmont Bedstraw	Low
Isolated in patches of open wet broad depression in upland flatwoods south of Hwy N			
Galium triflorum	4	Sweet-Scented Bedstraw	Rare
Isolated occurrences among ledges and boulders of upper headwater ravines in dry-mesic sandstone and dolomite forests			
Galium virgatum	4	Dwarf Bedstraw	Low
Isolated patches on dolomite glade, also yard and upland pastures			
Hedyotis longifolia var. ***tenuifolia***	5	Long-Leaved Bluets	Low
Exposed cherty soil in upland chert dry chert woodlands, upland flatwoods, along edges of dry sandstone ledges			
Hedyotis nigricans var. ***nigricans***	5	Narrow-Leaved Bluets	Moderate
Locally common on dolomite glades, openings in dry dolomite woodlands, along ledges and crevices of dry dolomite cliffs			
Hedyotis pusilla	3	Least Bluets	Very Rare
Isolated in barren exposed areas of dirt road in pasture, yard, and exposed barren chert clay of ROWs in upland flatwoods			

RUTACEAE — 1 Taxon

Scientific Name	C-value	Common Name	Abundance
Ptelea trifoliata subsp. ***trifoliata***	5	Hop Tree	Very Rare
Widely scattered in open chert woodlands along Hwy N near roadside glade			

SALICACEAE — 3 Taxa

Scientific Name	C-value	Common Name	Abundance
Salix caroliniana	4	Ward's Willow	Moderate
Scattered on gravel bars along Bryant Creek			

Salix interior	3	Sandbar Willow	Low
Confined to sandbars along Bryant Creek			
Salix nigra	2	Black Willow	Very Rare
Isolated along pond edge in front of house			

SANTALACEAE — 1 Taxon

Scientific Name	C-value	Common Name	Abundance
Comandra umbellata subsp. ***umbellata***	7	False Toadflax	Low
Widely scattered in upland flatwoods, dry chert and sandstone woodland			

SAPINDACEAE — 5 Taxa

Scientific Name	C-value	Common Name	Abundance
Acer negundo	1	Box Elder	Moderate
Scattered in riverfront forests, riverbanks, mesic bottomland forests, gravel bars			
Acer rubrum var. ***rubrum***	5	Red Maple	Moderate
Scattered locally in dry chert and sandstone woodlands, dry-mesic sandstone woodlands, upland flatwoods, dolomite talus slopes			
Acer saccharinum	2	Silver Maple	Very Rare
One tree planted by house; considered introduced			
Acer saccharum subsp**.** ***saccharum***	5	Sugar Maple	Moderate
Scattered to isolated border of dolomite glades, dry dolomite woodland, dry-mesic chert forests, mesic bottomland forests, dry-mesic sandstone woodlands, dolomite talus			
Aesculus glabra var. ***glabra*** 5	5	Ohio Buckeye	Very Rare
One small tree found on mesic dolomite forest slope above Bryant Creek			

SAPOTACEAE — 1 Taxon

Scientific Name	C-value	Common Name	Abundance
Sideroxylon lanuginosum var. ***oblongifolium***	5	Gum Bumelia	Low
Scattered on dolomite glades and dry dolomite woodland			

SAURURACEAE — 2 Taxa

Scientific Name	C-value	Common Name	Abundance
HOTTUYNIA CORDATA		Chameleon Plant	Very Rare
Confined to planted and escaped plants around lawn near carport; potentially a serious escape			
Saururus cernuus	6	Lizard's Tail	Low
Locally common along muddy edges of streambanks, bordering sloughs along Bryant Creek			

SAXIFRAGACEAE — 4 Taxa

Scientific Name	C-value	Common Name	Abundance
Heuchera parviflora var. ***puberula***	10	Small-Flowered Alum Root	Moderate
Locally common on dry to moist sandstone cliffs and ledges			
Heuchera richardsonii	6	Prairie Alum Root	Low
Widely scattered on moist to dry sandstone and dolomite ledges, cliffs, and boulders			

Micranthes palmeri	10	Palmer's Saxifrage	Low (S1)
Possible new state record under genetic study; scattered on moist to wet sandstone ledges and waterfalls			
Penthorum sedoides	3	Ditch Stonecrop	Moderate
Scattered on wet mudflats, edges of riverbanks, along sloughs, and pond borders			

SCROPHULARIACEAE — 20 Taxa

Scientific Name	**C-value**	**Common Name**	**Abundance**
Agalinus tenuifolia	4	Slender False Foxglove	Low
Isolated small patches on dolomite glades, barren openings in chert and sandstone woodlands, and open clayey soils of upland flatwoods			
Aureolaria grandiflora var. ***pulchra***	6	Yellow False Foxglove	Low
Isolated occurrences in open dry chert and sandstone woodlands, dry-mesic chert woodlands, dry sandstone ledges, dry dolomite cliff ledges, upland flatwoods			
Aureolaria pectinata	7	Clammy False Foxglove	Very Rare
Small patch of flowering plants found in open sterile dry chert woodlands			
Castilleja coccinea	6	Indian Paintbrush	Rare
Widely scattered in open dolomite glades, Ozark fen			
Dasistoma macrophylla	5	Mullein Foxglove	Rare
Isolated occurrences along streambanks of mesic bottomland terrace forests, riverbanks			
Gratiola neglecta	4	Clammy Hedge Hyssop	Rare
Locally in wet depressions in open upland flatwoods south of Hwy N, wet to muddy dirt roadruts of old logging roads, edges of artificial ponds, around sinkhole pond, and on mudflats			
Leucospora multifida	3	Obe-Wan-Conobea	High
Locally common on dolomite flatrock depressions of dolomite glades, widespread on mudflats, moist sandy edges of Bryant Creek, gravel bars, eroded riverbanks			
Mimulus alatus	5	Winged Monkey Flower	Low
Scattered along permanent headwater streams, seepy sandstone ledges in mesic sandstone ravines, spicebush terrace seeps, seepy dolomite ledges and boulders of Bryant Creek riverbanks, dolomite springs			
Nuttallanthus canadensis	3	Small Blue Toadflax	Very Rare
Isolated occurrence in open dry chert woodland			
Pedicularis canadensis	5	Lousewort	Low
Locally common along open mesic bottomland forests on stream terraces, lower slopes of dry-mesic sandstone woodlands, dry-mesic bottomland woodlands, mesic dolomite forests			
Penstemon digitalis	3	Foxglove Beard Tongue	Rare
Few plants found along seepy sandstone ledges			
Penstemon pallidus	5	Pale Beard Tongue	Low
Locally scattered in open dry chert and sandstone woodlands mostly south of Hwy N, along cherty open roadsides			
Penstemon tubaeflorus	6	Funnel-Form Beard Tongue	Low
Widely scattered on dolomite glades, open chert woodlands, along roadsides, openings in dry dolomite woodlands			

Scrophularia marilandica	3	Late Figwort	Low
Locally common in open dry-mesic bottomland woodlands, especially along dry gravel washes; rivebanks of Bryant Creek			
VERBASCUM BLATTARIA		Moth Mullein	Rare
Isolated occurrences along roadsides, pastures			
VERBASCUM THAPSUS		Common Mullein	Low
Disturbed gravelly openings in log landings, along logging roads, gravel roads, in pastures, utility ROWs			
VERONICA ANAGALIS-AQUATICA		Blue Water Speedwell	Very Rare
Few isolated occurrences on mudflats of Bryant Creek			
VERONICA ARVENSIS		Corn Speedwell	Low
Scattered in yard, around stable, roadsides			
VERONICA HEDERIFOLIA		Ivy-Leaved Speedwell	Moderate
Locally common in riverfront forests and mesic bottomland forests of Bryant Creek [2101]			
VERONICA POLITA		Wayside Speedwell	Rare
Sporadic in pastures and yard			

SOLANACEAE — 8 Taxa

Scientific Name	C-value	Common Name	Abundance
DATURA STRAMONIUM		Jimson Weed	Very Rare
Isolated occurrences on sandbars and gravel bars on Bryant Creek			
Physalis angulata	3	Cutleaf Ground Cherry	Rare
Widely scattered on sandbars along Bryant Creek			
Physalis pubescens	4	Downy Ground Cherry	Low
Widely scattered in old fields of upland flatwoods south side of park, upland flatwoods, pastures, roadsides.			
Physalis virginiana	3	Lance-Leaved Ground Cherry	Low
Scattered on dolomite glades			
Solanum carolinense var. ***carolinense***	0	Horse Nettle	Low
Scattered in pastures, old fields, around stable			
SOLANUM LYCOPERSICUM		Tomato	Very Rare
Few young plants next to old fire ring on gravel bar along Bryant Creek			
Solanum ptycanthum	1	West Indian Nightshade	Rare
Few scattered plants along dry open gravel wash			
SOLANUM SARRACHOIDES		Viscid Nightshade	Rare
One isolated scattered patch in upland flatwoods south of Hwy N [2129]			

STAPHYLEACEAE — 1 Taxon

Scientific Name	C-value	Common Name	Abundance
Staphylea trifolia	5	Bladdernut	Moderate
Isolated in dry dolomite woodland, dry dolomite cliff (ledges), dry-mesic dolomite forest, locally common in mesic dolomite forest and dolomite talus below Coon Den Bluff			

ULMACEAE — 6 Taxa

Scientific Name	C-value	Common Name	Abundance
Celtis occidentalis	3	Hackberry	Low
Widely scattered in dry-mesic to mesic bottomland forests, along stream terraces in valleys; occasional in dry woodlands and dolomite glades			
Celtis pumila	6	Dwarf Hackberry	Low
Widely scattered on dolomite glades			
Ulmus alata	4	Winged Elm	Low
Widely scattered on dolomite glades, dry open sandstone and chert woodlands			
Ulmus americana	4	Amercan Elm	Low
Isolated occurrences along riverbanks, mesic bottomland forests, edge of pond			
ULMUS PARVIFLORA		Chinese Elm	Very Rare
Single large tree in front of house; difficult to determine			
Ulmus rubra	5	Slippery Elm	Moderate
Scattered in dry-mesic dolomite woodlands, dry-mesic to mesic dolomite forests, mesic bottomland forests, dolomite talus, mesic bottomland forests on stream terraces. Thickets of shrubby diseased sprouts			

URTICACEAE — 4 Taxa

Scientific Name	C-value	Common Name	Abundance
Boehmeria cylindrica	4	False Nettle	Low
Moist to wet depressions of upland flatwoods, border of sinkhole pond, border of sloughs in riverfront forests, seepy dolomite ledges along riverbank at base of talus			
Laportea canadensis	4	Wood Nettle	Moderate
Locally common to dense in mesic bottomland forests and riverfront forests along Bryant Creek			
Parietaria pensylvanica	3	Pellitory	Low
Dry-mesic dolomite forests, mesic bottomland forests, moist dolomite ledges, dolomite talus, disturbed log landings, shaded moist clayey soil beneath sandstone overhangs			
Pilea pumila	4	Clearweed	Low
Scattered on shaded wet overhanging sandstone ledges of waterfalls, seepy dolomite ledges of moist dolomite cliffs, moist sandstone ledges, spicebush terrace seeps, seep ledges along sandstone ravine			

VALERIANACEAE — 2 Taxa

Scientific Name	C-value	Common Name	Abundance
VALERIANELLA LOCUSTA		Cornsalad	Very Rare
Isolated in grassy thicket above pond by house; only known location [2114]			
Valerianella radiata	0	Beaked Corn Salad	Moderate
Locally common on disturbed soil around log landings, old skid ditches, yard, pastures, dry chert woodlands, along dirt logging roads			

VERBENACEAE — 5 Taxa

Scientific Name	C-value	Common Name	Abundance
Glandularia canadensis	5	Rose Vervain	Very Rare
Isolated along Hwy ROW near glades, burn pile ash on dolomite glade, crest of dry dolomite cliffs			

Lippia lanceolata	3	Fog Fruit	Moderate
Wet depressions and borders of old sloughs, mudflats, riverbanks along Bryant Creek			
Phryma leptostachya var. ***leptostachya***	2	Lopseed	Low
Widely scattered in dry sandstone woodland, dry-mesic dolomite woodland, dolomite talus			
Verbena simplex	3	Narrow-Leaved Vervain	Low
Widely scattered on dolomite glades, exposed dolomite in ditches along Hwy ROW			
Verbena urticifolia	2	White Vervain	Moderate
Wet open depressions in upland flatwoods, dry-mesic bottomland woodlands, mesic bottomland forests, riverfront forests			

VIOLACEAE — 8 Taxa

Scientific Name	C-value	Common Name	Abundance
Cubelium concolor	7	Green Violet	Low
Widely scattered in well-drained steep shaded dry dolomite woodlands			
Viola bicolor	0	Johnny Jump Up	Very Rare
Scattered sparingly in yard			
Viola missouriensis	6	Missouri Violet	Low
Scattered in dry chert woodland edge of dolomite glade, dry-mesic and mesic bottomland forests			
Viola palmata	5	Three-Leaved Violet	Low
Widely scattered in dry to dry-mesic chert, sandstone, and dolomite woodlands and forests			
Viola pedata	5	Bird's Foot Violet	Low
Scattered on dolomite glades, dry dolomite woodlands, exposed open chert woodlands			
Viola pubescens	5	Smooth Yellow Violet	Moderate
Scattered in mesic dolomite forests, dolomite talus, mesic bottomland forests			
Viola sororia	2	Hairy Wood Violet	High
Locally common in most dry-mesic woodlands and forests, upland flatwoods			
Viola striata	3	Cream Violet	Moderate
Locally common in mesic bottomland forests and riverfront forests			

VITACEAE — 5 Taxa

Scientific Name	C-value	Common Name	Abundance
Ampelopsis cordata	3	Raccoon Grape	Moderate
Scattered covering small trees and shrubs along riverbanks of Bryant Creek			
Parthenocissus quinquefolia	3	Virginia Creeper	Low
Scattered on ground and climbing trees in dry-mesic sandstone and dolomite woodlands and forests, mesic bottomland forests, along riverbanks, climbing on dry dolomite cliffs			
Vitis aestivalis var. ***aestivalis***	5	Summer Grape	Low
Widely scattered in open dry and dry-mesic sandstone, chert and dolomite woodlands			
Vitis cinerea var. ***cinerea***	3	Winter Grape	Low
Scattered in mesic bottomland forests, riverfront forests, along open gravel washes, riverbanks			
Vitis vulpina	5	Frost Grape	Low
Isolated occurrences in dry chert and sandstone woodlands, dry-mesic and mesic bottomland forests			